Community Currencies:

The Price Of Attention And Cost Of Influence In A Networked Age
-or-
The Price Of Entry And Cost Of Exit In A Networked Age

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Abstract

Human attention is our scarcest resource. What we pay attention to determines the information we process, and the influence we exert over outcomes. Together, attention and influence form two sides of power: information and control. Two ubiquitous systems for regulating power—democratic and corporate governance—center on balancing two levers: money and voting. Both are tools of attention and influence, enabling principals to express preferences and align their agents in different ways. Yet, in the digital networked age—where attention spans geographic boundaries and goods are rarely "public" or "private"—these systems increasingly collide into a crisis of capture and overreach. This paper introduces PCARE (Plural Community Asset Resource Exchange), a novel model for community currencies that seeks to provision partial and plural goods by explicitly pricing attention and the cost of influence (or the price of entry and cost of exit). Specifically, PCARE is a dual-currency model that separates non-transferable, irrevocable stake for influence from transferable currency for resource exchange and attention—resolving money and voting to the same unit of account, yet introducing a trade-off. Being composable into broader networked currencies, PCARE offers a substrate for decentralized coordination that can scale into complex cooperation, overcoming the limits of economic growth through social innovation. Applied to artificial intelligence, community currencies offer a way to embed social context into neural networks, enabling more context-aware communication that harnesses the promise of AI agents while empowering participants to navigate their perils.

[†] For Dad, from VCARE to PCARE. A special thanks to Mikhail Nikulin and the Idena Community for their pioneering work in sublinear identity staking, which provided valuable inspiration and initial steps toward the development of the PCARE model.

Then the Pharisees went and plotted how they might entangle Him in *His* talk. And they sent to Him their disciples with the Herodians, saying, "Teacher, we know that You are true, and teach the way of God in truth; nor do You care about anyone, for You do not regard the person of men. Tell us, therefore, what do You think? Is it lawful to pay taxes to Caesar, or not?"

But Jesus perceived their wickedness, and said, "Why do you test Me, *you* hypocrites? Show Me the tax money."

So they brought Him a denarius.

And He said to them, "Whose image and inscription *is* this?"

They said to Him, "Caesar's."

And He said to them, "Render therefore to Caesar the things that are Caesar's, and to God the things that are God's." When they had heard *these words,* they marveled, and left Him and went their way.

Matthew 22:21, King James Version

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§1 Introduction

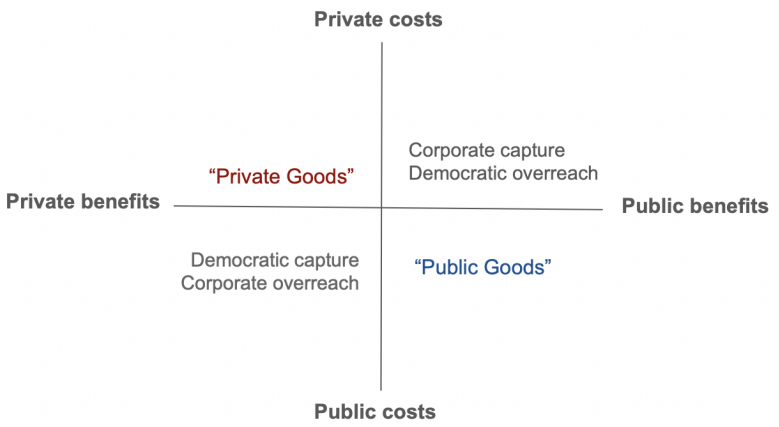
Money and voting have an uneasy dance in a networked age. Both are tools of attention and influence—conveying information and exerting control, enabling principals to *express* preferences and *align* their agents in different, often competing ways. Increasingly in the digital age, this delicate dance is spinning into conflict. Nowhere is the tension more acute than in two of today's most prevalent forms of political and economic organization: democratic and corporate governance.

> **Democratic Capture**: Citizens cast votes to elect representatives, who in turn raise money from a donor class. Donations fund campaigns to buy attention, typically ads. However, when the moneyed donor class wields more influence than the voting electorate, politics risks "capture"— *granting private benefits at public expense.* Here, money undermines the objectives of voting (Buchanan, 1962).
>
> **Corporate Capture:** Shareholders vote to align management and boards towards maximizing shareholder value. However, when a faction of shareholders pursue social objectives that diverge from profit maximization, corporate governance risks a different kind of "capture"—*granting public benefits at private expense.* Here, voting undermines the objectives of money (Friedman, 1970; Bebchuck, 2020).

The intersection between money and voting is messy, contested, and even *adversarial*. At the extreme, when money *buys* votes, the principles underpinning democratic and corporate governance—*one-person, one-vote* and *one-share, one-vote*—collapse to *one-dollar, one-vote*. In democracies, the price may be as trivial as a beer. In corporations, the cost may be derivatives to strip economic interest from shares, leaving only voting power (Hu, 2006). In both cases, voting power detaches from genuine stake, shielding plutocrats from the downside risks of their choices and enabling them to profit from decline—whether it be a nation-state or a firm.

The tension between money and voting extends beyond democracies and corporations to interactions *across* them, in networks. Beyond the risks of capture, the problem of overreach looms just as large:

> **Democratic Overreach**: Majorities impose costs on minorities, often untouched by the benefits—*pursuing public goods at private expense* (Olson, 1965).
>
> **Corporate Overreach**: Shareholders externalize costs onto society—*creating private benefits at public expense* (Hardin, 1968; Stiglitz, 2012).



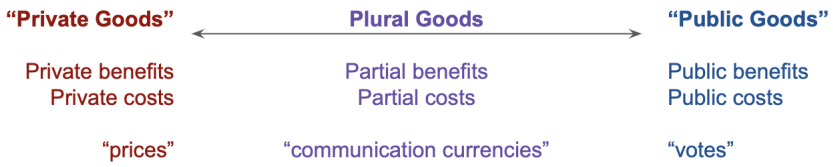
The twin challenges of capture and overreach reveal both the root problem and a starting point for a solution: *scoping* governance to the boundaries of the goods provided. In theory, markets efficiently provision private goods, while democratic systems provision public goods: hence, *prices for private goods, votes for public goods* (Samuelson, 1954). In practice, however, most goods are neither public nor private, but plural or *partial*—affecting participants to different *degrees* (Buchanan, 1965; Ostrom, 1999). Properly scoping goods requires not only acknowledging partial differentials (degrees of benefit), but enforcing their boundaries.

Yet, in the networked age, partial differentials in costs and benefits—in both "private" and "public" goods—invite coalitions, even across geography. Coalitions organize to amplify positive externalities and mitigate negative ones to their benefit—whether in democratic or corporate contexts, through capture or overreach, and at public or private expense. As coalitions grow in influence, they challenge us to define the enforcement boundaries between "legitimate cooperation" and "adversarial collusion," or "abuse" (Ostrom, 1990). What, then, is the better mechanism for provisioning the vast spectrum of plural goods, where the scope of goods and boundary of beneficiaries is not only expressed *partially and differentially*, but shifts fluidly with changing coalitions? Money, votes, or something in between?

1.1 Community Currencies: Bridging Public and Private

Community currencies offer unique laboratories for navigating today's tensions. Situated between individuals and nation-states, communities provision goods that are neither **public** nor **private** but instead in partial common ownership among members, who have different *degrees* of commitment. Plural goods include tangible assets like rivers, parks, or intangible assets like intellectual property and even good will. Issuing a currency forces communities to reconcile governance by **votes** with the creation of a **money** that acts as a unit of account, store of value, and medium of exchange. Communities also must balance **financial** contributions with **non-financial** ones, like labor and participation. What is the cost of influence for external investors, and the price of attention for community members? If the community were a firm, the answer would be the opportunity cost of capital and labor (Samuelson, 1990). But many communities—such as academic societies, open-source software groups, churches, or artistic collectives—pursue non-financial goals. Membership signals commitment to values or expertise, which cannot be *bought* but must be *earned*. Yet, these groups—whose main currency is **status**—also need funding to thrive. Community often must sacrifice status on the altar of necessity and money, but how much?

This paper introduces PCARE (Plural Community Asset Resource Exchange), a flexible model that aims to price attention (the cost of influence) and, by extension, entry (or exit) into a community. By introducing a tradeoff between accessing new communities for novel information (attention) and gaining more control (influence), PCARE enables the expression of partial differentials among participants, better scoping communities to the boundaries of the goods they provide. In this model, public and private goods are treated as edge cases, as are democratic and corporate governance.



By striking a third way, PCARE supports a wide range of communities with diverse priorities, bridging seemingly conflicting goals: capital and status, breadth and depth, and growth and mission. At the same time, PCARE accommodates change; afterall, churches split, companies become non-profits, collectives pivot into startups. By enabling fluid social recombination, communities can steward plural goods with evolving stakeholders and shifting priorities.

1.2 Roadmap to Plural Governance

This paper represents a convergence of three disciplines: economics, law, and cybernetics. Accordingly, the paper is structured into three parts, each reflecting the foundational principles of these fields while drawing on insights from others to produce a paradigm greater than either.

> **§2 PCARE** introduces a flexible dual-token model for community currencies, balancing transferable liquidity with irrevocable staking to frame a trade-off between attention and influence, or entry and exit. The section explains the mechanics of **square root staking, inflation, and burning,** and explains how these tools might curb speculation and deter opportunism.
>
> **§3 Enforcement** addresses PCARE's enforcement challenge—deterring strategic behavior such as **bribery** and **coercion**, while also empowering communities to differentiate between **cooperation** from **collusion** with context-sensitivity and legitimacy. Community recovery is introduced as a key enforcement mechanism, alongside two key principles: **plurality** and **subsidiarity**.
>
> **§4 Capture and Overreach** applies PCARE to the twin challenges of capture and overreach. This section demonstrates how community currencies can compensate for weaknesses in democratic and corporate governance while leveraging their strengths to create a new, networked paradigm: plural governance. This alternative emphasizes bottom-up provisioning through quadratic and **plural funding**—transforming governance into a networked process of feedback, adaptation, and **supermodular** innovation to overcome the limits of economic growth.

§5 Conclusion returns to the current crisis in governance, accelerated by global financialized attention auctions. Whereas global attention auctions create reflexivity in influence, community currencies create **reflexivity in context**. This approach opens new ways to revitalize civil society, revolutionize provisioning and public policy, and harmonize regulation for the digital, networked age.

Any new paradigm can be explored through multiple perspectives. Recognizing the profound promise and peril of systems of artificial intelligence, the **Appendix (Attention is All We Have**) explores how community currencies could embed social context into the structure of neural networks to balance freedom and security while enhancing both accountability and resilience against adversarial AI agents. This section is offered as a tentative, initial exploration—directing the reader towards the possibility of a social substrate for context-aware, networked AI governance in the digital age.

§2 The Model

2.1 Plural Community Asset Resource Exchange (PCARE)

A community has a currency distributed across an association set of n members. Each member i, at their discretion, *irrevocably* locks some portion as non-transferable "community stake" s and holds the remainder r as transferable tokens t. Just as commitments are not transferable, similarly community stake cannot be unlocked and transferred.

- Let n be the number of participants in the group.
- Let t be the total initial supply of tokens among participants
- Let t_i be the initial number of tokens allocated to participant i (where $i = 1, 2, \ldots, n$) such that:

$$\sum_{i=1}^{n} t_i = t$$

- Let s_i be the amount of tokens member i decides to irrevocably lock up as non-transferable community stake.
- Let r_i be the amount of tokens member i keeps as transferable tokens available for exchange.

The sum of community stake tokens and transferable tokens for each participant must equal their initial allocation

$$s_i + r_i = t_i \quad \text{for all } i = 1, 2, \ldots, n$$

The proportion of tokens locked up and the proportion kept transferable by a participant can be represented by a sliding scale parameter $\alpha_i \in [0,1]$ for each participant i, where:

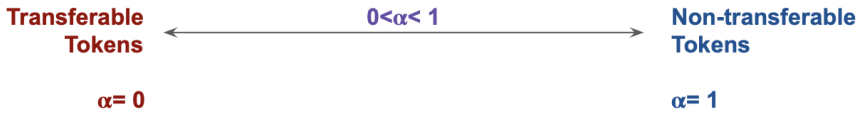
$$s_i = \alpha_i t_i \quad \text{and} \quad r_i = (1 - \alpha_i)\, t_i$$

Combining the above relationships, we get:

$$\begin{cases} s_i = \alpha_i t_i \\ r_i = \left(1 - \alpha_i\right) t_i \end{cases} \qquad \text{for all } i = 1, 2, \ldots n$$

where α_i represents the fraction of tokens locked as community stake for participant i.

Already, PCARE accommodates the spectrum of non-transferable (or soul-bound) tokens and fully-transferable tokens as special cases.



All members receiving tokens and not irrevocably staking any token is equivalent to an ERC-20 airdrop ($\alpha_i = 0$), while all members receiving the same numbers of tokens and irrevocable staking them is equivalent to all members holding one "soulbound" token ($\alpha_i = 1$).

Fully transferable tokens ($\alpha_i = 0$):

$$\begin{cases} s_i = 0 \\ r_i = t_i \end{cases}$$

Non-transferable tokens ($\alpha_i = 1$):

$$\begin{cases} s_i = t_i \\ r_i = 0 \end{cases}$$

Furthermore, the model accommodates degrees of membership. For example, new members to a community receiving a smaller allocation of tokens and irrevocable staking them is equivalent to acknowledging *degrees* of membership in a non-financialized group.

2.1.1 Voting Power: Irrevocably Staking for Influence

In PCARE, voting power requires irrevocable stake *s*. Members face a tradeoff between staking more for greater influence in the community versus keeping tokens transferable for use as a medium of exchange (i.e. currency). The question is the steepness of the trade-off. With square root (or quadratic) staking, each next unit of stake confers less voting power (or influence) than the previous unit of stake, enabling members to signal the intensity of their commitment to a group, but with diminishing returns (Penrose, 1946; Posner & Weyl, 2015). Thus, a participant *i*'s voting power V_i is the square root of their locked community stake;

$$V_i = \sqrt{s_i}$$

Substituting s_i:

$$V_i = \sqrt{\alpha_i t_i}$$

And the total voting power V in the group is the sum of of the individual voting power of all participants:

$$V = \sum_{i=1}^{n} V_i = \sum_{i=1}^{n} \sqrt{\alpha_i t_i}$$

2.1.2 Inflation as a Community Based Income (CBI)

Communities will grow in different ways. At the outset, groups may set an arbitrary inflation rate i (periodically adjusted by voting) and pursue a combination of strategies on the spectrum of financialized to non-financialized growth. A financialized strategy would auction new tokens to the highest bidder, allowing external capital to drive growth. A non-financialized approach would distribute tokens based on participation or contributions, enabling members to earn their way into the community. Between these extremes lie hybrids, such as offering bounties, prizes, or dominant assurance contracts, which offer financial incentives for contributions (Tabarrock, 1998).

- **Financialized** (buy with money): auction off a new lot of tokens to the highest bidder (money)
- **Hybrid**: bounties, prizes, or dominant assurance contracts
- **Non-financialized** (earn through time): distribute tokens based on time spent contributing to the community (e.g., attending community events)

Another approach is **Community Based Income (CBI)** where communities distribute inflation to existing members based on their locked stake, adjusted by a square root. Specifically, the tokens R_i that participant i receives from inflation is the inflation rate X multiplied by the square root of their locked community stake s_i:

$$R_i = X \cdot \sqrt{s_i} = X \cdot \sqrt{a_i t_i}$$

The intuition behind CBI is that community members who share the costs of a plural good should also share in its benefits. However, larger stakers have diminishing returns and no single participant disproportionately benefits. Members can then choose to freely gift or sell their tokens, depending on the community's design choice to permit financialized or non-financialized transfers.

2.1.3 Burning & Ex-communication

Communities are distinguished from cultures—a shared set of beliefs and practices—by also implying *commitments* (e.g., Hippocratic Oath, watering plants, contributing code) (Wenger, 1998). Failures to fulfill commitments may be penalized with exclusion from inflation rewards, or at the extreme, "burns." A totalistic burn of a member's community stake is akin to ex-communication, so their influence (and earned CBI) goes to zero. Communities will approach penalties in different ways. But to eschew unjust tyrannical majorities, witch hunts, vigilantism, and strategic behavior, burning requires a process that yields "fair" and "just" outcomes. §3 explores this enforcement question in greater depth, drawing on principles of diversification, or plurality, to form computational juries.

2.1.4 Modifications & Limitations: From Quadratic to Plural

SCARE and CARE

Square root staking avoids majoritarianism (or excessive influence by holders of stake), while allowing participants to express the intensity of their commitment.[1] However, it also assumes that communities can penalize actors who attempt to bypass the square root rule by creating fake accounts (account-splitting) or colluding to distribute stake across multiple accounts (account-consolidation). This may be a reasonable assumption to the extent communities periodically convene in-person to confirm identities (either simultaneously as a group or multi-laterally). Otherwise, the square root introduces a unique enforcement challenge that requires two more conditions—subsidiarity and plurality—explored in greater depth in §3.[2] To the extent enforcement is weak, some communities may adopt a lesser discrimination of $0.5 < p < 1$ ("**SCARE**") or linear staking where $p = 1$ ("**CARE**").

$$V_i = s_i^{\,p}$$

Furthermore, square root staking is a starting point for apportioning voting power, but has a key limitation. Mainly, it presumes participants are informationally independent, where in practice, many participants share beliefs and desires because of overlapping, shared communication—as reflected in overlapping community members. Because quadratic staking rewards *numerical diversity*—where many smaller stakeholders outweigh a few large stakeholders in influence—even weakly coordinating, informationally similar small stakeholders ("humans acting like bots") can overwhelm large stakeholders in influence (Weyl, 2017).

Plural Staking

Plural staking (or voting) offers an improvement by rewarding *informational diversity*, elevating consensus across multiple perspectives. Informationally similar participants get discounted in influence, whereas informationally unique participants gain a bonus. Put another way, participants who can bridge divides (because they are more different) earn a **"bridging bonus"** to their voting power while those reinforcing divisions (because they are more similar) incur a **"correlation discount."** The intuition behind plural voting is that broad-based consensus, forged across multiple perspectives, leads to more durable and widely beneficial outcomes while mitigating the risks of "overreach" and "capture"—whether by dominant majorities or well-coordinated factions (Ohlhaver, Weyl, & Buterin 2022).

How to quantify informational diversity or "consensus across difference" in plural voting is an open, active research question. *Ex-ante* community memberships (as reflected in stake) captures overlaps in information, or communication channels. *Ex-post* behavior, such as voting history, captures historical context

[1] Another variation of the model is quadratic voting, instead of quadratic staking. In quadratic voting, community members receive voice credits linearly proportional to their stake, and allocate voice credits across different proposals based on the intensity of their preference. Once credits are allocated across proposals, they are square root adjusted to determine their final voting power (Posner, Weyl, 2018). For the sake of simplicity, this model presumes quadratic staking.

[2] Notably, other methods to establish account control (e.g., biometrics) also require periodic re-authentication to avoid one-time account sales, and legal enforcement of administrators to avert spoofing during authentication (Ohlhaver, 2024). Whereas global protocols require global enforcement (risking global surveillance), community currencies push the enforcement down to the level of the association set. *See* §3.3.3

and divides, and furthermore mitigates gaming through artificial affiliations ("anti-correlation palaces") that, in practice, vote uniformly. Balancing these variables is a question that this paper revisits in §3 (Enforcement).

Community Restrictions

Creating a community is an act of exclusion—differentiated by shared goals, missions, or circumstances (Taylor, 2004). Communities may go beyond membership criteria to regulate how their currency is used. For example a community might limit transfers to specific participants or purposes; require qualifications such as credentials, location, or affiliations; or impose taxes or bonds based on social distance to compensate for risk. Alternatively, a community may be open to broader recipients (bots, synthetics welcome). Access thresholds for resources can also vary, reflecting membership levels (stake thresholds) or proximity to the community. While communities adapt these rules to align with their goals, values, and local context, there are inherent costs to excessive exclusion, redlining, or discrimination. §3 (Enforcement) explores how natural incentives for security and legitimacy push participants and communities to diversify their connections, making excessive exclusion a costly strategy.

2.2 A New Paradigm

2.2.1 The Price of Attention and Cost of Influence

Community currencies unlock a new paradigm for pricing attention and influence, where both represent two sides of an economic trade-off. Participants continuously decide between seeking new connections to access novel information (attention) or making irrevocable commitments to gain greater control and voting power (influence). The "price of attention" reflects what participants must "pay" in transferable currency to gain attention (or "sell" to give attention). Meanwhile, the "cost of influence" reflects the price of acquiring voting power, including the opportunity cost of locking their stake irrevocably. Notably, this trade-off between fluidity and commitment can also be framed in reverse—as "the price of influence and the cost of attention"—underscoring their dual interdependence.

This interdependence means that an escalating price of attention also drives up the price of influence. Within a given community or social layer, attention and influence exist in horizontal tension—participants must decide how to allocate resources between transferable currency for exchange (attention) and non-transferable stake for governance (influence). However, in a vertically nested network—where communities are embedded within sub-networks and broader networks with subsidiarity—the price of attention follows a continuum, escalating into a higher price for influence within any given social layer. From this vertical perspective, influence is the deepest circle of attention—accessible only through irrevocable commitments, or stake.

PCARE situates individuals at the intersection of many community currencies, continuously weighing their trade-offs and relative value. Members have an incentive to stake tokens only if the influence gained—which has diminishing returns—justifies the opportunity cost of lost transferable currency to access—or communicate—with other communities. Thus, PCARE encourages members to allocate their attention towards the plural goods they care most about, continuously trading currencies against each other for access and influence across different community goods. Those who benefit most from a good will stake most, while those who benefit least while stake least. Periodic inflation allows members to reassess the relative value of a community good; some may decide to restake all inflation rewards whereas others might opt for liquid tokens as a medium of exchange to access other communities and stake elsewhere.

As conditions change, so do equilibriums. Currency prices rise when there is an aggregate community preference to irrevocably stake tokens (shifting the supply curve to the left) or when there is a "foreign" demand to buy attention or influence in the community (shifting the demand curve right). Communities that fail to respond to increased demand with increased supply (inflation) face "price shocks" that price out participants from buying transferable currency to access community goods, decreasing the community revenue. [3] In this way, community currencies offer a practical solution for expressing relative value and managing access to shared, plural resources across participants.

2.2.2 The Price of Entry and Cost of Exit

Another way to frame the trade-off introduced by community currencies is between *voice* and *exit*. *Exit, Voice, and Loyalty* describes two responses to dissatisfaction: *exit*—the market option to leave (e.g., switching to a competitor, leaving a country)—and *voice*—the political option to stay and push reform from within. *Loyalty* is the third factor, delaying exit by encouraging individuals to give voice a chance before exit (Hirschman, 1970). A common misconception is that exit and voice are mutually exclusive, but they are complementary and mutually implicated mechanisms for accountability; voice is stronger when exit is a credible threat, as the possibility of leaving pressures organizations—whether a political system or monopoly—to listen and adapt in response to feedback. At the same time, there's a delicate balance: when exit is too easy, people are less likely to invest in using voice. And when exit is too hard, people have to rely on voice to drive reform.

The model eschews the binary of "voice" *or* "exit" in favor of a spectrum of "voice" *and* "exit." At each inflation interval, members navigate how much to stake for influence (voice) versus how much to keep liquid as transferable tokens (exit), depending on their values, goals, and changing circumstances. The choice—to stake or not stake—represents a differential shift in the balance between voice and exit, or irrevocable stake (influence) and transferable tokens (liquidity). Like attention and influence, the price of entry and cost of exit represent two different ~~two~~ perspectives on the same economic trade-off. The "price of entry" is the opportunity cost of staking tokens for influence—sacrificing liquidity in exchange for voting power (or voice) within the community. On the other hand, the "cost of exit" is the opportunity cost of keeping tokens liquid, as a medium of exchange, forfeiting greater influence, or voice, in the community.

Under PCARE, exit is never totalistic and absolute but unfolds along a gradient, with every allocation of tokens subtly shifting the balance between voice and exit. Members who feel misaligned with the community can trade liquid tokens for access to other goods or stake influence elsewhere. But even when choosing liquidity (exit), their locked community stake—even if diluted by inflation—ensures they always retain some influence (voice) in the community. This comports with the intuition that while members can shift across communities, their history of affiliations imprints their identity. Even if ties weaken over time, a connection remains.

[3] Similarly, to the extent a community borrows and issues debt, changes in the real interest rate relative to other currencies will also shift the supply and demand curves; specifically, shifting supply curve to the right, and demand curve to the left if there is a relative increased in real interest rate on foreign bonds relative to the community bonds. Expected depreciation of the currency would also have a similar effect.

2.3 First Order Effects

The rest of this paper explores how PCARE restructures governance in democratic and corporate systems, tackling persistent challenges of capture and overreach in a networked age. These issues are not confined to nation-states and firms but are equally endemic to cryptocurrency protocols, DAOs, and memecoins, where they often manifest as financial speculation and strategic behavior. This section offers a brief interlude to examine PCARE's first-order effects on emerging digital economies under the assumption of perfect enforcement.

2.3.1 Taming Speculation

Excessive speculation undermines capital markets by increasing volatility, raising the cost of capital, and diverting resources away from productive investments (Shiller, 2000). PCARE curbs speculation by making influence non-transferable and rewarding long-term commitment over short-term trading. Specifically, speculators focused on quick gains will avoid irrevocable staking for voting power, as staked tokens are illiquid. Instead, they will opt for transferable tokens, which provide liquidity but confer neither voting rights nor access to inflation rewards. Consequently, speculators are effectively taxed through inflation, which redistributes value to committed stakeholders. Communities battling interloping speculators can further dilute speculative positions by increasing inflation rates.

By contrast, participants who stake their tokens gain increasing influence over governance decisions, ensuring those with influence over priorities have a vested and long-term interest in the community's success. Additionally, because inflation rewards are allocated based on stake (adjusted with a square root), long-term holders see their influence and rewards increase over time, further aligning incentives toward commitment and value creation rather than short-term price fluctuations.

2.3.2 Curbing Strategic Behavior and Opportunism

Opportunistic behavior occurs when individuals or coalitions divert or steal resources for private gain at the expense of the larger group. Tunneling involves non-arm's length transactions where valuable community assets are transferred or sold at a discount to insiders. Looting, by contrast, entails outright fraud or theft, such as embezzlement or fund misappropriation. Community currencies deter opportunism by raising the cost of influence. Both tunneling and looting require voting power, but under PCARE, influence follows a model of diminishing returns: each additional unit of stake yields progressively less voting power. This superlinear cost (n^2 *tokens for n votes*) makes it significantly more expensive for insiders to consolidate control compared to linear systems like token-voting (*n tokens, n votes*) or shareholder-voting (*n shares, n votes*).Additionally, any attempt to gain voting power comes at the cost of liquidity, as staking requires committing transferable currency. For tunneling or looting to be profitable, the value of the stolen assets must exceed both the cost of irrevocable stake (control) and the opportunity cost of spending currency elsewhere (information). The same logic applies to leveraged attacks: the value of the extracted assets must outweigh the cost of borrowed funds (plus interest), which remain locked and unrecoverable. Unlike *one-token, one-vote* or *one-share, one-vote* systems, which are vulnerable to opportunistic "whales" who amass influence, manipulate governance, and exit with a "dump," community currencies lock whales into the ecosystem, aligning their incentives with the long-term health of the community.

Opportunistic behavior within a community is a localized form of "corporate overreach" or "democratic capture"—*granting private benefits at public expense*— but contained within the community. Instead of externalizing costs to society at large, smaller coalitions shift burdens internally for their own gain. §3 explores how subsidiarity and plurality help enforce the square root (protecting it from bribery), while §4 examines how community currencies mitigate more subtle forms of capture and overreach within networks.

§3 Enforcement

When two sources of influence—such as money and votes—are traded, the result is "bribery." Unpunished, more subtle challenges like "capture" and "overreach" become insurmountable. This paper adopts a familiar law-and-economics enforcement model: **deterrence**, where the probability of detection and the severity of penalties has to exceed the perceived benefits of accepting a bribe. Each of these variables plays a role in making bribery an unappealing strategy (Becker, 1968). This section introduces the enforcement mechanism—"**community recovery**"—alongside two key assumptions—**subsidiarity and plurality**—to address all three deterrence variables: bringing proportionality in punishment, increasing the probability of detection, and obscuring the benefit of the bribes.

This section offers a first sketch of decentralized enforcement, building foundations rather than a fully formalized model. Conventional models of bribery (and coercion) root in atomistic notions of "control"—*either I control my key or I do not*—and are an outgrowth of *homo economicus* assumptions that treat individuals as isolated, rational agents, rather than as *participants* in complex, interdependent communication networks of attention and influence, starting with communities. This section builds an alternative vision, grounded in *partial, differential* interplays of information and control, which underpin a *spectrum* of communication in a network—from coercion, collusion to cooperation. Here, emergent social structures and networks are not just a byproduct of these interplays, but are actively leveraged to target attention, or enforcement scrutiny.[4]

3.1 The Deterrence Challenge

PCARE clarifies the deterrence problem by resolving money and voting to the *same unit of account.* But instead of simply collapsing money to votes (like *one-token, one-vote* systems), the model opens a trade-off space *between* money and votes; a participant has to choose between treating currency as "money" (transferable) or "votes" (non-transferable), but not both. The result is votes have a *price*, based on the value of transferable currency and the number of votes that can be irrevocably bought. In a linear model of participants choosing between money and votes 1:1, the price of currency is both a floor and ceiling to the price of a vote—acting as a natural deterrent to bribery, where no seller ought to accept less than the equilibrium price, and no buyer ought to pay more.

PCARE is more ambitious, however, applying a square root so the next vote is more expensive than the last (*n^2 tokens buys n votes*): 1 token buys 1 vote, 4 tokens buys 2 votes, 9 tokens buys 3 votes, etc. The price of 1 token sets a floor to the "cost of bribes," but the model gives strong incentives for participants to trade *above* the market price. For example, if a participant has staked 15 tokens, buying and staking one more token for $5 (the market price of a token) increases their voting power from $\sqrt{15} \approx 3.87$ to $\sqrt{16} = 4$—a marginal gain of only 0.13 votes. In contrast, if the participant bribes a community member—more than $5—to deputize their vote, the briber gains an additional full vote aligned with their interests at lesser cost than staking themselves. In fact, the briber should be willing to pay anywhere between $5 and $45 for the extra vote—a premium up to $40 above the

[4] This enforcement challenge mirrors the problem of defining externalities with partial differential benefits; scoping who is affected and to what degree, in turn, requires scoping who is responsible and to what degree—both requiring proportionality in attention and influence.

token's price.[5] Thus, while PCARE clarifies the deterrence challenge, square root staking also complicates it: bribery becomes a cheaper alternative to staking, particularly for participants who already hold significant stake.

3.1.1 Penalties: Inflation as Carrots, Burns as Sticks

Deterrence is a balancing act of incentives. In PCARE, a participant considering a lucrative bribe has to weigh the risk of getting caught and the penalty of burned stake—*the stick*—against the ongoing benefits of remaining compliant and earning inflation rewards, or community-based income (CBI)—*the carrot*. Even if a disaffected community member sells *all* their transferable currency, their irrevocable stake continues to accrue inflation rewards, aligning their interests with the community long-term. Thus, any bribe forces a participant to consider not only the potential social costs (ex-communication by a burn), but the discounted future value of inflation rewards they risk forgoing. This calculation is not so obviously straightforward. Community currencies change in relative value and communities can always recalibrate inflation rewards to match new threats. Even the most disaffected member who has sold off all their transferable currency and neither values their influence nor their community—a prime target for bribes—may opt to accrue inflation rewards and sell them off as periodically awarded. They may prefer a gradual decline in their influence and rewards rather than risking detection and the reputational damage of a burn.

Carrots and sticks alone—no matter how well-designed and calibrated—are toothless without credible enforcement mechanisms to backstop them. Even if penalties are strong, if participants believe they won't get caught—or, worse, if they can cast doubt on the legitimacy or fairness of the judgment—they are more likely to accept a bribe. To address this side of the deterrence equation requires a clear and credible enforcement mechanism: *community recovery.*

3.1.2 Community Recovery: A Decentralized Enforcement Mechanism

Burned stake is the penalty of a bribe, making an account's "wallet"—housing irrevocable stakes and transferable currencies—the natural focal point of enforcement. Typically, *social recovery* allows participants to designate trusted individuals who, by qualified majority, can restore wallet access in cases of theft or coercion (Buterin, 2021). But the same mechanisms that safeguard against coercion—ensuring a participant's choices reflect genuine consent—must also enforce bribery penalties. After all, coercion and bribery differ only in *mens rea* (intent): both involve external pressure, distinguished only by whether the participant's compromised choice was made under duress (coercion) or voluntarily (bribery). **A mechanism designed to detect when agency has been involuntarily taken must also determine when it has been voluntarily sold—making "recovery" and "enforcement" two sides of the same coin**.

With some key modifications, social recovery can be adapted to community enforcement—or "community recovery" (Ohlhaver, Weyl & Buterin, 2022). Rather than relying on a self-selected subset (limited by the participant's perspective), community recovery leverages multiple perspectives with local knowledge. Broadly, when a bribery allegation arises, a subset of community members, diversified across biases—akin to a "**computational jury**"—examines the evidence to determine whether it meets the threshold for further investigation, before inspecting a wallet or initiating a burn. To work, community recovery relies on two

[5] The same vulnerability exists in mechanisms like quadratic voting, where a participant's stake can be distributed across various proposals, with their voting power for each proposal adjusted by the square root. In both cases, the purpose of the square root is to temper majoritarianism by making each additional vote more costly.

principles; *subsidiarity* and *plurality*. With subsidiarity, juries are a subset drawn from members who have a stake in the issue (stakeholders). Whereas subsidiarity leverages local knowledge, plurality in turn balances juries across multiple perspectives—drawing on community members who are less alike or dissimilar to cancel out idiosyncratic biases (or majoritarianism). **Whereas subsidiarity enriches the *depth* of context, plurality (or diversification) increases the *breadth* of context**. Combined, both maximize unique information in context-sensitive judgments tasked with distinguishing legitimate "cooperation" from illegitimate "bribery" in enforcement cases, or coercion in recovery cases.[6]

Communities will experiment with different statistical methods for quantifying diversification to form computational juries. (Grim et al., 2024). Like plural voting, which also leverages diversification, some approaches focus on ***ex-ante* commitments** (such as community membership) to prioritize less-affiliated members with less overlapping communication—the logic being that the less participants are talking to each other, the fewer biases they share (Miller et al., 2022). To correct for gaming, other approaches focus on ***ex-post* behaviors,** such as revealed voting behavior computed securely without revealing identities (Buterin, 2019). Community currencies accommodates and enriches either approach by expressing *degrees* of membership and *degrees* of voting power, while opening bridges to more classic methods, such as examining the correlation of "returns" within each member's weighted portfolio of currencies (Markowitz, 1952).[7] Whichever method or combination chosen, community currencies offer a computational substrate to rapidly assemble a jury diversified across idiosyncratic bias—thereby increasing the likelihood of impartial judgments while mitigating the risks of overreach and capture, whether by a centralized enforcer, colluding subset (witch hunts, vigilantism), or tyrannical majorities that undermine the legitimacy of enforcement.

3.1.3 Subsidiarity: Scoping Scrutiny with Stakes

Community recovery is the enforcement mechanism, but requires a high probability of detection—a resource challenge requiring efficient allocation of scarce attention. Just as a community has two dimensions—the breadth of members and the depth of their commitment—similarly, enforcement has two dimensions: **horizontal and vertical proportionality**. Horizontally, enforcement should be narrowly tailored to the scope of the violation, inviting only relevant actors and resources who have a stake in the problem. Vertically, scrutiny and penalties should scale with the stakes of the violation; larger violations warrant greater attention and harsher penalties, while smaller violations warrant less. Because community currencies define memberships through degrees of stake, they offer a seamless and rich substrate for narrowing the scope and scale of investigations to increase the probability of detection.

Consider horizontal proportionality first. When a community's diversified jury forms consensus around a violation, horizontal proportionality ensures that a penalty would be limited to burned community stake—confined to the affected community, not applied network-wide. To extend scrutiny beyond the affected community, the accused would have to breach obligations across interconnected communities, represented by participation in a shared, unifying umbrella currency and for example, accepting a bribe in that broader currency. This incremental, stake-based *partial* approach to scaling investigation across a network limits the

[6] Just as bribes are limited to specific community stakes, so may be theft and coercion. As a condition of staking, participants might agree *ex ante* to *partial* privacy—allowing a diversified jury to unlock *partial* wallet aspects related to the shared stake, assuming consensus. Accessing broader wallet information would require both cooperative agreements with other communities and their judgment that the matter justifies their attention (i.e. by virtue of shared stake).

[7] In fact, whereas classic portfolio management theory stops at diversifying idiosyncratic firm risk, community currencies pick up to diversify idiosyncratic risks across stakeholders (*see* § 4.4).

involvement of irrelevant or distant actors—balancing privacy and accountability—while leveraging the rich, local knowledge of diversified juries who have stake in the matter to reduce the risk of enforcement errors.[8]

Whereas horizontal proportionality limits scrutiny to the scope of stake, vertical proportionality scales scrutiny to its *value*. These two principles have an obvious tension. When global currencies are *more valuable* than community currencies, vertical proportionality risks overriding horizontal limits on scope, as heightened glocal scrutiny subsumes local scrutiny under their enforcement. Top-down global surveillance not only undermines the incentive for community enforced currencies, but contradicts their very purpose. To preserve horizontal limits, vertical proportionality requires an additional condition to express subsidiarity: ***local stakes must be more valuable than global stakes.*** In other words, information and control—power—should pool locally rather than globally, so community currencies exert greater influence over local outcomes than global currencies.[9] Consequently, the penalty—or loss of influence—from burned stake is higher locally than globally.

Subsidiarity in power creates a virtuous cycle of efficient enforcement: higher local penalties motivate participants to pay more attention to policing local bribes, leveraging richer, high-bandwidth communication and interactions (context) at lower monitoring costs. Close-knit communities, in particular, benefit from frequent in-person interactions that contextualize evidence and detect irregularities, such as behavioral shifts, external pressures, or unusual financial activity (Ostrom, 1990). Thus, subsidiarity ensures proportionality in enforcement, sharpening scrutiny in high-stakes local communities where context is high and monitoring costs low, while softening scrutiny in low-stakes global communities where context is low and monitoring costs are high.

3.1.4 Subsidiarity as a Shield: Protecting Against Bribes

Community currencies require subsidiarity, but without a shared commitment to valuing local power, subsidiarity can easily backslide into surveillance—centralized information and control. Recent advances in privacy-preserving tools provide communities with new ways to encode subsidiarity into their communication, making backsliding harder. These tools enable communities to govern the use (*usus*), misuse (*abusus*), and benefits (*fructus*) of information—allowing for a partial, tiered approach to information disclosure and access (Nissenbaum, 2010). With encoded subsidiarity, bribes become harder for distant and global actors to accurately price.

Consider the informational differences that arise depending on the position within a network: as a community member, a proximate participant, or a distant actor. Membership to a community implies an agreement to generate and share information as a group—in communication—with expectations about how that information can be used and profited from. Even within communities, there will be "inner" and "outer" circles of communication, depending on whether the participant has staked for influence or whether they are a mere interloper trading transferable currency for attention. Socially adjacent communities will lack access to a community's channel, but given overlap through shared members may opt to disclose additional information, such as aggregate statistics in demographics, shared priorities, cleavages, or points of consensus—securely computed and shared using zero-knowledge proofs. Such partial disclosures express information about

[8] There will be a balancing act between diversifying a jury across multiple perspectives (lesser affiliated members), and picking members with enough stake to constitute a jury member. One jury qualification can be holding irrevocable stake, as opposed to holding the currency in transferable form.

[9] This is not as controversial a proposition as one considers that the most valued, high-bandwidth, non-fungible relationships defy a price and have significant impact on well-being—like family— compared to more "lower-bandwidth", fungible relationships—like work.

communities without revealing member identities, preserving privacy while disclosing enough information for possible cooperation. With enough common ground, two groups may form an umbrella currency to open a shared space for dialogue, while nonetheless maintaining their own internal channels.

Moving farther out in a network, disconnected communities without overlapping members won't see the other's consensus points, cleavages, members, or necessarily ties with other groups. Gathering such information is costly, requiring an exchange of community currency—which the target community may decline or tax to compensate for risk—possibly negating the benefits of the bribe.[10] Furthermore, without overlap, socially distant actors lack the necessary information to target bribes, let alone accurately price them. Instead, subsidiarity will redirect participants to forge partial and incremental ties with more visible, less distant communities. These connections, built on shared members and therefore shared stake, invite greater scrutiny to deter bribery. In this way, subsidiarity fosters partialism and incrementalism in cooperation, building on existing informational, cultural, and normative overlaps to broaden ties while leveraging the same relationships for deterrence.

3.2 The Spectre of Surveillance

Although subsidiarity shields communities from socially distant bribes, it also creates vulnerabilities closer to home. Participants in overlapping communities will gain an informational edge through shared stakes and access to shared channels, knowing participants' beliefs and desires to anticipate cleavages and align consensus. The partial differential nature of shared goods—being neither public nor private—and the fluidity of community currencies make shared goods (and the communities organizing around them) easily reconfigurable. Specifically, because quadratic staking supports numerical diversity—many small stakes having more influence than a few large stakes—a few intersectional participants with an information edge can persuade low-stake voters (many small stakes) in two communities to re-coalition into a broader, umbrella community that requires greater surveillance for enforcement. This risk is not "bribery" per se, but a more subtle challenge of "excessive coordination," at best, or "collusion," at worst—both of which can redirect attention and participation toward broader, more global communities. Moreover, when an intersectional participant is positioned to handle enforcement (conveniently because they control some aspects of communication infrastructure), this information edge can quickly accelerate into a control edge. Much like in media ecosystems—where controlling more channels consolidates influence—dominant actors in overlapping communities can continue to exploit their edge to eventually transform bottom-up subsidiarity into vertically integrated, top-down surveillance (Zuboff, 2019). This vulnerability motivates a second principle: *plurality*.

3.2.1 Security Through Diversity: Raising the Cost of Influence with Plurality

The principle of subsidiarity is to delegate control to the lowest level capable of effectively addressing an issue. Put another way, subsidiarity localizes control to the lowest level where information is generated. In contrast, the **principle of plurality promotes diversification (or anti-correlation) in communication to bridge divides.** If power is information and control, plurality disrupts power toeholds by rapidly disseminating *information* to relevant participants with enough shared context—overlapping beliefs, desires, norms, culture

[10] Moreover, under subsidiarity, since local currencies are more valuable than global currencies, higher value of local currencies makes bribes priced in global currency effectively more expensive (perhaps even cancelling out any gains from bypassing the square root discrimination).

and even shared uses of language. This shared context enables participants to integrate novel, non-obvious information, driving social recombination which, in turn, breaks *control* edges.

Already, the principle of plurality is embedded within *community recovery*, which gives participants a strong security incentive to diversify social ties. Within a community, diversification to include members with varied affiliations mitigates the risk of witch hunts, vigilantism, and tyrannical majorities, broadening the range of participants (and their biases) for more impartial judgments across multiple perspectives. Personally, diversification of affiliations *across* communities mitigates the risk of theft or coercion; participants who lose partial or whole access to their wallet can appeal to a qualified majority of lesser correlated, non-overlapping members across different communities—talking to the participant but not each other—to recover access. Both forms of diversification *broaden communication*—extending conversation to participants who share enough context to be sensitive to nuance but remain siloed enough (not talking to one another) to prevent an informational advantage that could enable bribery, coercion, or outright theft of a participant's wallet under the guise of enforcement.

Community recovery's security incentive to diversify social ties also *raises the cost of influence*. The more communities overlap in members, the more overlapping communication streams, resulting in shared common biases (or risks) that tend to move together, or be correlated (Simmel, 1955).[11] Since community currencies function as *communication currencies*—exchanged to gain access to community channels—diversification superficially means exchanging currencies where they are less circulated, but more profoundly means communicating with people and groups with less shared biases. As participants diversify across currencies, they gain access to more novel, non-obvious information which empowers them to better assess the risk and ramifications of who they cooperate with, including accepting a bribe. When this diversification occurs in "high-bandwidth" currencies—characterized by repeat, in-person interactions—the cost of influence rises even further; participants are better equipped to internalize the social (and emotional) costs of bribery on their community, hardening the disincentive to sell their votes. **This combination of depth, breadth and diversity in a participant's community currencies has the potential to superlinearly increase the cost of influence, rendering even small-scale bribes impractical.**

3.2.2 Plural Voting: Bridging Divides and Obscuring the Benefit of Bribes

Plurality can also compensate for subsidiarity's limitations closer to home. Whereas subsidiarity makes bribes harder for socially *distant* actors to price (by obscuring individual stakes), plural voting—an improvement on square root voting—obscures the price of bribes for socially *proximate* actors. Rather than maximizing raw votes, **plural voting** maximizes different *kinds* of votes. Participants may still stake to express the intensity of their commitment (and face the discrimination of the square root) to temper majoritarianism, but their final voting power depends on how well the policies, proposals, or candidates under consideration bridge divides among members—whether those divisions be historical disagreements (reflecting in voting history) or social divisions (reflected in stake). Votes that bridge divides earn a **"bridging bonus,"** while those that reinforce divisions incur a **"correlation discount."**

[11] "The individual may add affiliations with new groups to the single affiliation which has hitherto influenced him in a pervasive and one-sided manner. The mere fact that he does so is sufficient, quite apart from the nature of the groups involved, to give him a stronger awareness of individuality in general, and at least to counteract the tendency of taking his initial group's affiliations for granted." (Simmel, 1955).

In plural voting, the lack of information about a participants' voting history undermines a briber's ability to accurately price bribes, even if they know all affiliations. A members' voting history is a key input in calculating bonuses (or discounts). Techniques such as trusted execution environments, zero-knowledge proofs, and homomorphic encryption can ensure that sensitive computations—like computing influence according to plural voting rules—are verifiable without revealing the necessary historical voting data.[12] Thus, unable to calculate "bridging bonuses," socially proximate actors fail to target bribes.

3.2.3 Breaking Edges: Reconfiguring Power with Plurality

Plural voting gives greater weight to less correlated perspectives. The effect is to surface common ground bridged across multiple perspectives more likely to serve the community's broader good. But diversification also has a second effect; mainly, to gain greater voting power, **participants have an incentive to *become* bridges.** As participants diversify their connections, they not only strengthen their personal security against theft, cancellation and coercion (broadening their ties for community recovery), they also extend communication lines to deliver non-obvious, useful information—sparking social recombination in the process. **As quickly as an information edge forms from overlap; anti-correlation penalties quickly dissolve the edge as bridges push information out, recombining groups across new lines in the process.** Instead of reinforcing old divisions, brides ceaselessly cut across new lines, revealing and reconciling adversarial interests, reconfiguring old asymmetries, carving new cleavages into new communities. Thus, whereas subsidiarity fosters partialism and incrementalism in cooperation, plurality accelerates the pace of recombination to broaden, deepen, and thicken networks of cooperation with social complexity— interweaving solidarities to reach farther distances than subsidiarity on its own, while cutting informational edges that otherwise risk deepening into control toeholds and surveillance.

3.2.4 Hardened Voting: Proofs of Complete Knowledge and Receipt-Freeness

Advancements in cryptography provide additional tools to deter bribery. One tool is "receipt-freeness," an *ex-post* measure that prevents a voter from proving to a third party how they voted, even if they want to (Juels et al., 2005). Without the ability to furnish proof, bribers cannot verify whether the voter complied with their demands, undermining the credibility of vote-selling. Another mechanism, "Proofs of Complete Knowledge," is an *ex-ante* safeguard, which requires participants prove that they can use their private key in whatever way they want *before* they vote (Kelkar et al., 2023). Since participants cannot deliver a proof of encumbrance (e.g., evidence that their key is locked to the briber's conditions), they also can't credibly sell or rent voting rights.

But these cryptographic tools—while salutary in ambition—have a blind spot: their perspective is restricted to digital interactions to the detriment of not integrating social interactions in "meatspace." For example, in blockchain contexts, even if a private key is unencumbered "on-chain" so a participant can provably vote in whatever they want on-chain, participants can still relinquish control "off-chain"—selling, renting, or

[12] For example, TEEs execute voting computations in secure, isolated environments, revealing only the final influence score while keeping the underlying voting history encrypted. ZKPs enable participants to prove their influence was computed correctly according to plural voting rules, such as bridging bonuses or correlation discounts, without exposing specific votes or behaviors. Similarly, homomorphic encryption allows computations to be performed directly on encrypted voting data, ensuring that sensitive information remains hidden even during the computation process, while cryptographic commitments and hashes can verify correct execution according to the voting rules.

sharing access (Ohlhaver et al., 2024).[13] Collapsing "on-chain" and "off-chain" to a physical voting booth—doesn't solve the "control" problem either. Information shapes beliefs, which underpins decisions, including how to cast a vote. Even if a participant ostensibly "controls" their private key—free of encumbrances—voting under false pretenses has the same effect of relinquishing key control. The information asymmetries that underpin "control"—and the deeper, subtle interplay between attention and influence—highlight the limitations of purely *technical* solutions to "bribery" and "coercion" and motivates the crux of this paper.

Community currencies open ways to de-monopolize attention, raising the cost of influence for both bribers and coercers alike. In the most subtle cases of coercion, less informed participants have few options, don't know them, or don't know their value—enabling a coercer to wield off-chain levers of control because they have more information and control more resources. (On the other hand, in bribery, participants control *enough* resources and have *enough* knowledge to justify penalties and burned stake). By making influence explicit, PCARE empowers participants, as a first step, to redirect attention away from circumstances they can't influence to productive collaborations they *can*—starting as small as church groups or local civil society. Over time, this attention redirection broadens communication beyond a single actor to different groups, diversifying a participant's information. These *partial entries and exits* in communities, in reality, are partial entries and exits in information and control, that slowly fracture a coercer's monopoly (Linz, 2000). As affiliations grow and cut across new lines, a briber similarly faces an increasingly complex web of interconnected and recombining relationships that begin to differentiate a person informationally—making control more resource-intensive than targeting someone who is isolated, decontextualized, and informationally undifferentiated. To the extent affiliations are non-overlapping, the cost of influence may rise superlinearly and reinforce what Proofs of Complete Knowledge alone cannot guarantee: on-chain proofs are credibly backstopped by off-chain agency, precisely because participants are informationally differentiated *enough* to recognize bribes, resist coercion, and understand the value of their options.[14]

3.3 Strategic Challenges

3.3.1 Empty Voting: Strategic Voting Without Stake

Bribery in democratic governance refers to trading money for votes. Corporate governance presents a parallel but structurally distinct problem: shareholders can "rent their votes" temporarily for a fee. Alternatively, they can retain voting power while shedding their economic stake—often using derivatives to hedge or offset risk. Both strategies are broadly referred to as "empty voting," where shareholders isolate voting power from economic interest. At the extreme, empty-voting allows participants to influence decisions to the detriment of a firm, while profiting from the decline (profiting from puts or positions in competitors that stand to benefit.)

[13] Worse, bribers may bypass direct access altogether and exploit alternative levers of control, such as personal relationships, economic security, or status— social threats not mitigated by cryptography.

[14] Community currencies also help define the scope of *legitimate* encumbrances—a question that tools like Proofs of Complete Knowledge are agnostic about. For instance, in delegation, members of a community might *want* encumbrances on their delegate's wallet to track and constrain their votes to a subset of options. A plural vote that reflects broad based consensus across multiple perspectives could define the narrow set of legitimate ballot options. In this way, community currencies provide the requisite social layer for sense-making around "legitimate" encumbrances, enforcing penalties for illegitimate ones and ensuring adherence to commitments made in cooperative agreements.

Community currencies mitigate empty voting by tying voting power to irrevocable stake. Unlike corporate shares—where voting rights can be separated or borrowed—any attempt to "rent" votes constitutes a "bribe" rather than a market transaction, which communities have a strong incentive to detect and punish. At the same time, participants cannot easily shed their economic interest. Even if participants sell their transferable tokens, staked assets continue to yield rewards through Community Basic Income (CBI)—keeping "skin in the game." Finally, attempts to hedge are complicated by the uncertainty of future rewards; inflation means that any attempt to calculate discounted future rewards is inherently speculative. As a result, constructing offsetting financial positions to neutralize economic exposure becomes costly.

The risk of empty voting is particularly acute in winner-take-all resource conflicts. The attack unfolds as follows: a participant belongs to two competing communities, conceals their conflict of interest with split wallets, uses derivatives to shed most of their economic exposure in one community, and votes against that community's interests—strategically tilting the outcome in favor of the other. If their preferred community prevails, they profit from currency appreciation, more influence, or financial derivatives they've purchased. However, executing this attack relies on several factors: the reputational cost of maintaining split accounts (thinner identities), access to derivatives, the ability to avoid detection, and the unlikely alignment of circumstances where two communities are in conflict in a way that maps onto split wallets. Typically, when a participant splits wallets, it will be to manage risk and separate domains of life, rather than to anticipate and stoke conflicts within overlapping social circles, making such attacks both complex and improbable.

Community currencies do not eliminate resource competition, but they do open an alternative: structuring competition into collaboration, and resolving conflicts through recombination. Instead of competing for a resource, two communities can form a joint currency to bridge participants. Those who find the resource valuable can stake to purchase and govern the asset—excluding those who deem it overvalued. Rather than being confined to their original communities, participants self-sort into a new community aligned around their shared value of the resource. With members from both original groups, this new community is more likely to detect and penalize a strategic participant attempting to "play both sides" after shedding their economic stake. Under scrutiny from this cooperative third group, empty voting becomes a far less viable strategy. In this way, community currencies shift resource battles away from zero-sum financial engineering toward long-term, positive-sum coalition-building.[15]

3.3.2 Gaming Influence: Account Splitting and Account Consolidation

So far, this paper has focused on policing bribes—where participants accept payments to deputize their vote. However, a more covert way to game influence is through **account splitting**—bypassing the square root's discrimination with multiple accounts—or **account consolidation**—banding together with other participants to split stake across their pool to gain more influence. These tactics evade direct traceability yet distort influence in ways similar to bribery. In fact, strategies like empty voting presume account-splitting as a first step. Thus, the

[15] Community currencies have more implications on financial markets than the scope of this paper allows. Whereas corporate shares separate control from consumption, community currencies align them; those who value a good most have an incentive to irrevocably stake the most. By tying governance directly to participation, community currencies aspire to shift incentives away from short-term speculation and extraction to long-term stewardship and cooperation. As stakes remain persistent and non-transferable, financial markets cannot easily create synthetic control structures for detached, opaque financial engineering. Instead, value creation depends on participation, adaptive coalition-building, and even prediction. In this way, community currencies do not merely neutralize empty voting—they aspire to redirect financial markets towards more positive-sum productivity.

deterrence challenge extends to account splitting and consolidation—whether it be coerced, colluded, or purely self-motivated, opportunistic behavior.

Communities will police account-splitting with the same scrutiny and context-sensitivity as bribes. Under subsidiarity, "higher-bandwidth" local communities benefit from lower monitoring costs because of periodic in-person voting and verified peer-to-peer interactions. Heightened scrutiny over a smaller surface area makes detection easier; one-person cannot physically show up as two. When caught, participants risk burned stake in both their split and more established ("thicker") wallets. Repeated burns—especially across non-overlapping and uncorrelated communities—will trigger red flags to prospective collaborators, imposing a reputational cost to both socially proximate communities and broader global communities. This cost may take the form of a risk premium, expressed through a bond (temporarily locked stake) or a tax—further deterring account-splitting.

Account consolidation presents a more nuanced challenge, as distinguishing between "innocent cooperation" and "adversarial collusion" depends on context-sensitive judgments. However, if account splitting is effectively policed, the risks of consolidation diminish. Gaming influence through consolidation requires pooling resources and staking them irrevocably as a coalition. Expanding influence, in turn, demands onboarding new members with additional stakes. This forces groups hoarding influence to either stay small and be outcompeted by more open coalitions or expand and dilute insider control, making extraction harder. As a result, PCARE naturally steers governance toward influence earned through participation rather than concealed through fragmentation. Over time, what may initially appear as "collusion"—if it is to be sustained—begins to resemble altruism, reinforcing the foundations of community building rather than undermining governance.

3.3.3 From Sybil Resistance to Surveillance Singularity

Global currencies have a more complex enforcement challenge: maximum monitoring costs with minimum context. Detached from human interactions, global currencies have to rely on universal credentials, which invites a two-sided enforcement challenge. The first is to identify a credential that **separates humans from bots** and enforce a 1:1 correspondence between humans and accounts (*de jure* sybil resistance). As humans integrate with technology and synthetic biology advances, however, defining "human" inevitably falls short of an exact science, instead inviting false positives and negatives. Second, even assuming perfect enforcement of *de jure* sybil resistance, a deeper challenge emerges: **deterring human beings from being informationally controlled as if they were programmable bots** (*de facto* sybil resistance). The same UBI incentive that motivates participants to verify a global credential also gives other participants a strong incentive to corral and control other human accounts for more income and influence (Ohlhaver et al., 2024).

Both sides of *de jure* and *de facto* sybil-resistance return us to the dual nature of power: information and control, or attention and influence. One participant controlling many fake accounts (account-splitting) invites a flipside challenge of many participants being informationally controlled by a few (account-consolidation). Thus, global currencies invite global enforcement, which must navigate the grey area between legitimate "cooperation" (humans voluntarily forming coalitions to lobby for shared interests) and "collusion" (humans unwittingly being organized and consolidated into human farms) on a global scale—a challenge that invites global surveillance.[16]

[16] Unlike community currencies, where consolidation is an act of community-building or altruism, global currencies lack external alternatives or competing communities, making consolidation prone to oligopolistic power competition and inviting global surveillance.

The problem with global credentials is not global surveillance *per se*, but the gravitational pull of the surveillor's gaze on attention. Whereas community currencies leverage local context and multiple perspectives for sensitive judgments, the surveillor has a single vantage point, tasked with integrating all perspectives below. Inevitably, contradictions will come to the fore when a set of communicative acts are deemed "collusive" globally but "cooperative" locally—since such judgements are context-sensitive and depend on vantage point. As inevitable errors arise, the surveillor compensates by ratcheting up surveillance, deepening their control edge with more information, in a vicious cycle. Caught between competing standards—the surveillor's and their communities'—participants shift their attention and conform toward the increasingly powerful surveillor (or "observer") who wields greater influence over their outcomes. This attention alignment toward the same feedback makes participants more informationally similar—or "aligned" in beliefs and desires—further centralizing power.

Paradoxically, the surveillor's observer effect collapses the very social structures necessary for enforcement. Changing commitments, as reflected by stake, encodes information necessary for forming juries across multiple perspectives for context-sensitive judgements. The surveillor's deepening gaze, however, stymies this emergent social order and healthy social recombination because participants communicate their differences to each other *less*, and instead increasingly conform to the surveillor's standards *more*. Over time, judgments about "coercion," "collusion," and "cooperation" (*de facto* sybil resistance) or what combinations of biology and technology constitute a "human" (*de jure* sybil resistance) harden into arbitrary rules and rigid classifications of "good" versus "bad" communication. As conformity increases, the enforcement appears easier—creating a false impression of compliance—when, in reality, it has only homogenized participants, informationally and even physio-technologically. As global currencies edge towards more perfect enforcement, a narrow set of idiosyncratic and technology biases universalize into systemic risk. **Unchecked, the surveillor's gaze—however benevolent its intentions, goals or heuristics—expands into a force that bends communication, compressing the information function of money and votes into compliance, until all participants become the *same*, leaving no differences to coordinate around.**

The principles of subsidiarity and plurality offer a bottom-up alternative to sybil-resistance that averts top-down surveillance. As long as participants value local currencies *more*, communities can police account-splitting through multi-perspective, context-sensitive judgments with greater scrutiny, penalties and legitimacy. In turn, bridging bonuses push information out to spur recombination along new lines, undercutting account-consolidation. By leveraging computational juries internally and bridging bonuses externally, communities achieve both *de jure* and *de facto* sybil resistance with diversified communication. Ironically, whereas *global* sybil resistance makes participants the *same* and reduces the cost of influence, the pursuit of *local* sybil resistance makes participants more *unique*, raising the cost of influence. In this way, plurality and subsidiarity shift interactions away from the spectrum of "coercion" and reactive "bribery" ("humans acting like programmable bots") towards interactions on the spectrum of "consent" to " intentional engagement" ("humans being agentic").

3.4 Open Research Questions on Deterrence

Community currencies prioritize efficient enforcement—not perfect enforcement—redirecting resources to where they matter most: more valuable local currencies receive greater scrutiny, while less valuable global currencies receive less. This raises critical research questions:

Bribery & Collusion in Global Currencies: Under conditions of subsidiarity, global currencies, with their broader scope and lower scrutiny are inherently more vulnerable to bribery and collusion, whether through account-splitting or account-consolidation. The extent of this vulnerability and its impact on the local currencies' premium remain open questions for further research.

Scalability of Sybil Resistance: Can subsidiarity and plurality, by increasing the cost of influence through social complexity, provide a foundation for sybil resistance (*de jure* and *de facto*) in global currencies? If so, can these properties transfer across scales, offering some degree of deterrence even in global enforcement?

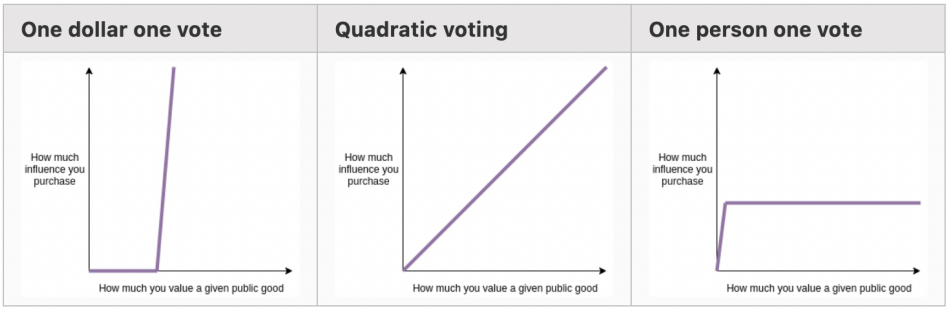
Divergent Staking Mechanisms: Local currencies are better suited to square root staking, while global currencies may rely on sublinear or linear models (SCARE and CARE). How do local and global currencies interact when their staking mechanisms differ? And how do these variations influence the cost of influence and the price of attention?

Subsidiarity & Plurality: Subsidiarity without plurality risks stagnation, rigidity, and hyper-localism, where decision-making becomes insular and resistant to innovation. Conversely, plurality without subsidiarity risks creating complexity untethered from ground truth, lacking the local accountability necessary to ground decisions in reality. While plurality is a mathematical challenge of diversification (operated on non-transferable stake and transferable currency), subsidiarity is a *social* challenge; participants have to *value* localized information and control more than detached, global currencies, appreciating the risks of surveillance. To what extent can plurality compensate for a lack of subsidiarity, or reinforce it?

These questions define the frontier of research in networked governance, asking how community currencies scale and integrate into global systems.

§4 Capture & Overreach

Both corporate and democratic governance began with simplistic designs prone to tyranny: direct democracy risked a "tyranny of the majority," where numerical majorities could impose their will on minorities (Madison, 1787), while early corporate governance faced a "tyranny of majority shareholders," where insider deals and self-dealing impoverished minority shareholders (Berle, 1932). These tyrannies were different kinds of excessive influence. In democratic systems, *one-person-one-vote* (1p1v) distributes influence equally but fails to account for varying levels of commitment, over-representing indifferent voters and under-representing those most affected by decisions—risking a tyranny of the democratic majority. Conversely, *one-token, one-vote* (1t1v) amplifies the influence of the wealthiest participants who may care disproportionately about their own interests, while marginalizing those with fewer shares—resulting in a tyranny of the wealthy (Buterin, 2019).

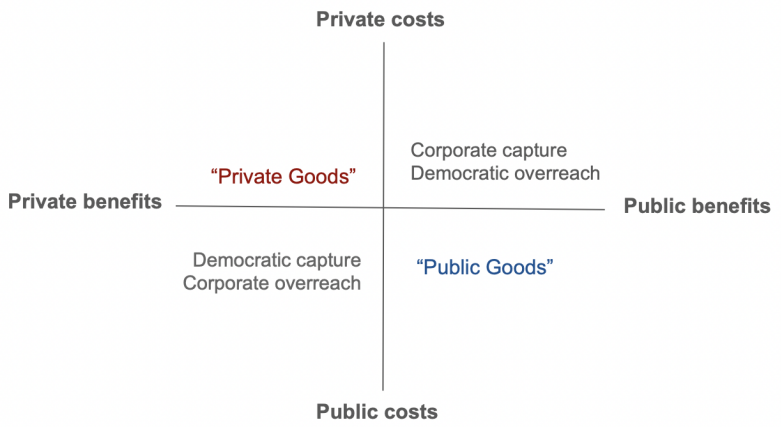

One dollar one vote
Quadratic voting
One person one vote
How much influence you purchase
How much you value a given public good
How much influence you purchase
How much you value a given public good
How much influence you purchase
How much you value a given public good

[17]

To compensate for these risks that threatened legitimacy, both systems incorporated safeguards against abuse. Democratic governance evolved mechanisms such as checks and balances, representative institutions, the Bill of Rights, and federalism—striking a third way between the abuses of direct democracy and the abuses of monarchical power (Hamilton, Madison, & Jay, 1788). Similarly, corporate governance adopted boards of directors, fiduciary duties, and shareholder protections like voting rights, access to information, and legal remedies—aimed to align incentives and prevent looting of minority stakeholders (Berle, 1932; Easterbrook, et al., 1991).

Despite these safeguards, both systems remain vulnerable to overreach. In democratic overreach, broader public benefits are pursued at the expense of narrower private groups. Classic examples include abuses of eminent domain and civil asset forfeiture, where the state seizes private property under the guise of public benefit—often without fair compensation or due process, disproportionately harming vulnerable individuals and smaller property owners (Epstein, 1985). Conversely, in corporate overreach, private benefits are pursued at the expense of broader public groups. The classic example is pollution, where corporations may opt to externalize costs—shifting the burden of cleanup and health consequences to the public at large (Coase, 1960).

[17] Buterin, Vitalik. 2019. "Quadratic Payments: A Primer." *Vitalik Buterin's Website*. December 7, 2019, see https://vitalik.eth.limo/general/2019/12/07/quadratic.html.



If "overreach" represents the *excesses* of corporate and democratic governance, "capture" occurs when these governance systems are subverted to serve purposes fundamentally at odds with their original design. If the purpose of democratic governance is to provision shared goods that participants would have little incentive to on their own, then "democratic capture" is when narrower private benefits are extracted at the expense of the broader public. A classic example is when a donor class exerts outsized influence by funding political campaigns and lobbying, steering policies and subsidies toward their private interests at the expense of taxpayers (Tullock, 1967; Becker, 1983; Lessig, 2011). Conversely, in "corporate capture," broader public benefits are pursued at the expense of shareholders. A modern example is a "whale" (dominant shareholder), management, or the board prioritizing broader socially and politically motivated policies that impose costs on all shareholder (Roe, 2003).

4.1 Community Currencies: Bridging the Gap between Public and Private

Both capture and overreach stem from a failure to appropriately align the scope of costs and benefits across stakeholders, allowing coordinated groups with outsized influence to extract benefits for their preferred groups at the expense of others. Community currencies aim to address this mis-scoping by narrowing the scope of beneficiaries of policies with those who bear their costs—bridging the gap between the "public" and the "private" to create a "plural" framework.

In fact, both democratic and corporate governance can be viewed as special cases of PCARE. Early experiments in direct democracy are equivalent to each citizen holding a non-transferable token irrevocably staked ($\alpha_i = 1$), embodying the principle of *one-person, one-vote* with equal influence for all. At the other extreme, early corporate governance operated as *one-share, one-vote* ($\alpha_i = 0$); without any staking, the system defaults to a linear token-voting model where voting power is proportional to transferable shares.

Community currencies bridge the gap between these political and economic extremes ($0 < \alpha_i < 1$) by unlocking a trade-off space between transferable currency and non-transferable stake. In this hybrid model, participants irrevocably stake tokens in proportion to their commitment (or how much they care) while their influence—or voting power—grows at the square root of their stake, introducing diminishing returns to caring *excessively* and curbing the dominance of large holders. Transferable currency, in turn, serves as a medium to

exchange to trade (or communicate) with other communities. Navigating this trade-off transforms participants from passive beneficiaries into active stakeholders who continuously have to weigh whether to stake currency for more influence within their communities or trade it for access and influence to new communities. Because participants who care more stake more, political influence becomes tied to the shared goods (and externalities) that matter most to the individual. This self-sorting better aligns the scope of beneficiaries (those who benefit from decisions) with payers (those who fund or bear the costs of those decisions).

PCARE transforms the dominant forms of social organization—corporate and democratic systems—into a flexible form in between that leverages their respective strengths while compensating for weaknesses. From corporate governance, community currencies inherit *degrees of stake* or ownership to determine influence; from democratic systems, the principle of *irrevocability* ensures accountability. **Whereas markets enable *totalistic exit* via money and shares at the expense of accountability, and politics relies on *totalistic voice* at the expense of autonomy, community currencies strike a middle ground; members to a community never entirely escape accountability—holding their irrevocable stake forever—but never entirely give up autonomy either—earning community-based income (CBI) to spend and stake elsewhere.** PCARE's dual structure of tokens opens a flexible feedback loop: participants dissatisfied with their current community can stake their currencies elsewhere to form new coalitions while retaining their original stake, exiting to new groups while sharing in the costs or benefits of their previous commitments. This flexibility between *stake-for-influence* and currency as a *medium-of-exchange* enables individuals to participate in communities with varying degrees of membership and influence, fostering what Danielle Allen terms "polypolitanism"—enabling affiliations with multiple communities in a way that opens participants to the possibility of multiple, even non-overlapping affiliations (Allen, 2023).

This section now turns to applying PCARE to address the twin challenges of "capture" and "overreach" in democratic and corporate governance. Rather than offering a unifying framework, this section explores how PCARE reimagines and renovates aspects of these governance systems, building incrementally to reveal a bottom-up, networked alternative that transcends the artificial divide between "public" and "private" to unlock a more powerful paradigm: *plural governance.*

4.2 Democratic Capture

Democratic capture occurs when decision-making is controlled by a small group prioritizing their own interests over the broader electorate—pursuing "private benefits at diffuse public costs." The most common vectors are special interest lobbying and campaign finance. In lobbying, elected representatives draw on input from experts, advocacy groups, and lobbyists when legislating on behalf of their constituents. However, even well-intentioned representatives are vulnerable to "capture," prioritizing the concentrated interests of lobby groups who have more information about an issue over the diffuse interests of their constituents (Buchanan & Tullock, 1962). Similar incentives apply to campaign finance, where a small group of wealthy donors may wield disproportionate influence over candidates who depend on campaign contributions to secure re-election (Downs, 1957; Lessig, 2011). While the effect of capture is misaligned costs and benefits, the root cause is underpriced attention of elected representatives, who then become a conduit for under-priced influence. Community currencies recontextualize money, increasing the price of attention and the cost of influence to align elected representatives with their constituents.

4.2.1 From Lobbying to Collaborative Governance

Democratic accountability depends on an asymmetry of transparency: constituents must know more about their representatives than vice versa (Mill, 1861; Fishkin, 1995). As a result, public figures entrusted with power are owed less privacy than private citizens (Brandeis & Warren, 1890). This principle extends to attention and influence—voters should see how a candidate allocates their attention, even though candidates do not have the same reciprocal visibility into their constituents. Community currencies can formalize this accountability by linking public office to the act of holding a constituent's currency. A winning candidate would receive their constituents' currency and, as a condition of holding office, commit to trading their attention through it. In this way, if representatives are tasked with communicating and acting on behalf of their constituents, holding and transacting in the community's currency becomes a tangible reflection of that responsibility. This model enhances transparency while simultaneously raising the cost of influence in lobbying—two essential pillars of accountability.

Community currencies make lobbying transparent by revealing how representatives allocate their attention. A history of exchanges not only exposes their priorities and the lobbyists they engage with but also situates them within a broader social and economic network. This transparency enables constituents to provide counter-feedback, surface conflicts, and identify potential bridges for compromise—assisted even by AI agents (see Appendix). Rather than representatives engaging in isolated negotiations, constituents can actively redirect discussions and assert their inputs as principals, ensuring their interests remain central. This shifts the political process from a static evaluation every election cycle into an ongoing, collaborative governance model between principals and agents. By continuously realigning their representatives' priorities in smaller time-frames and issue-specific contexts, constituents ensure governance remains responsive to their needs in light of new challenges and emerging information in real time.

Furthermore, a history of currency exchanges enables constituents to hold their representatives accountable by assessing how well they struck compromises and integrated community feedback. As the gap between principals and their agents narrows, "private benefits doled out at public costs" shift toward "plural goods shared at collective costs." To the extent there are widening and unexplained gaps, they provide grounds for investigating undue influence—or bribes—where a candidate excessively trades in *other* community currencies, rather than their constituents.' As discussed in §3 (Enforcement), penalties for such breaches take the form of a "burn," determined through context-sensitive judgments by constituents across multiple perspectives. These assessments require distinguishing between "personal" and "political" transactions—a sensitive judgement closely tied to the broader challenge of differentiating "collusion" from "cooperation."

PCARE goes beyond simply creating a currency for a community and mandating political trades within it—an approach that can quickly collapse into an open auction for influence, where the most valuable currencies dominate under conditions of weak subsidiarity. Lobbyists have a better chance of achieving their outcomes when they not only buy a representative's attention, but when they also irrevocably stake governance tokens to influence constituents—exposing themselves to the same upside and downside as the community. This fundamentally alters lobbying dynamics: rather than detached outsiders dictating policy through financial leverage, influence becomes contingent on genuine integration with constituents. Unlike conventional systems—where dollars directly buy both attention and influence in a linear, transactional manner—PCARE requires that those seeking to influence governance irrevocably stake their interests in the community, making influence accountable rather than a commodity for sale.

4.2.2 From Campaign Finance to Context-Aware Finance

Traditional campaign finance relies on decontextualized donor funds—fiat or global currencies from donors with untraceable origins—providing only broad disclosures of donor groups while obscuring their deeper interests, biases and positioning within a larger economic network. Community currencies recontextualize money, embedding context into campaign finances and thus making the biases of a candidate's funding sources transparent. When donors contribute community currencies, they reveal both the immediate communities backing a candidate, but also the broader network in which they are embedded and their social distance. This measurement of distance is enabled by the networked representation of individuals, where *degrees* of participation (stake) in different communities defines their position within a social fabric. Since a community can be modeled as a constellation of overlapping constituent communities which members are a part of—extending infinitely—this fabric can be represented in vector space.[18] While partial privacy and selective disclosures ensure that no two participants have an identical perspective of the social fabric, each participant can still measure their proximity to a political contribution and assess the **"thickness"** of shared connections. This partial transparency enables constituents to gauge how well their interests align with a candidate's donor base and identify potential conflicts—or gaps—that are likely to require resources to bridge.

The flipside of raising donor funds in campaign finance is spending them to win the attention of constituents. Today attention is bought through ads on cable news, social media, and other global channels—stripped of context, commodified, and even accessible to adversarial actors on social media. Global auctions treat all attention *the same*—underpricing attention in many cases—while buyers skirt accountability for misleading content. **Community currencies disassemble a global attention auction into many constituent attention auctions, empowering communities to become sellers (and guardians) of their own attention.**[19] By virtue of subsidiarity, the price of attention in local communities will be higher than broader, more global sub-networks. Intuitively, communities will prioritize meaningful in-person interactions, or depth over breadth, whereas sub-networks will prioritize breadth over depth. This nested structure introduces "attention buffers" in political communication, encouraging candidates to start with broader, lower-cost, low-bandwidth "outer channels" (or sub-networks) to gauge relevance and refine their messaging before committing substantial resources to narrower, higher-cost, higher-bandwidth "inner channels" (or communities). In turn, candidates have a strong incentive to allocate scarce resources strategically, targeting communities with the greatest overlap and shared context—finding the "shortest bridges" to connect with aligned constituents and form coalitions.

4.2.3 From Campaign Subsidies to Quadratic and Plural Funding

Campaign finance has a free-rider problem: individuals have little incentive to contribute to a candidate when they believe others will shoulder the burden, which leads to underfunded campaigns for candidates representing broader community interests and overfunded campaigns for candidates aligned with concentrated, narrow interests. Community currencies empower communities to identify and support candidates who better represent their broader interests, while overcoming the free-rider problem. Specifically, candidates who raise political contributions from members within a community can win a subsidy, issued either from community

[18] Notably, a networked representation of communities is the mirror of a networked representation of individuals (different degrees of participation of different individuals.)

[19] One frequently proposed reform for campaign finance is transforming political ads into a Harberger auction, where ad space is sold to the highest bidder, with proceeds directed to the community treasury to fund shared goods. While this approach improves on the current system—where communities derive no direct benefit from political ads—it still falls short of allowing communities to actively feedback their own preferences into what they want to pay attention to.

inflation or drawn from the community's irrevocably stakes treasury.[20] With quadratic funding, political candidates who receive small contributions from many community members win a greater subsidy than candidates who receive a few large donations (Buterin, Hitzig, & Weyl, 2018). For example, $1 contributed equally by 10 people is matched by $99 to generate $100 in total, while $10 contributed by a single person receives no match. (Precisely, candidates receive matching funds proportional to the square of the sum of the square roots of individual contributions.[21]) By prioritizing small contributions, quadratic funding ensures that broader, shallower contributions from many—reflective of candidates campaigning on broader, shared goods—receives greater subsidies, while narrower, deeper contributions—reflective of candidates campaigning to deliver narrower, private goods—receive less.

A more advanced campaign subsidy is plural funding (Ohlhaver, 2022; Miller, 2022). Whereas quadratic funding rewards *numerical participation* (subsidizing candidates who garner *many small* contributions), plural funding rewards the *diversity of contributions* (subsidizing candidates who attract many *different* contributions.) Quadratic funding assumes participants are informationally independent, making it vulnerable to weak cooperation (e.g., $1 contributions) among large, homogeneous populations that can dominate matching funds. When such populations are even weakly coordinated through controlled communication, quadratic funding risks reinforcing capture by elites who wield disproportionate influence—or have a "control edge"—over communication. Plural funding addresses this vulnerability by prioritizing informationally unique contributions—specifically rewarding candidates who win contributions from historically divided and less-overlapping factions. Such candidates demonstrate their ability to bridge divides, earning subsidies as *integrative agents* who unify diverse interests and find (un)common ground. In this way, candidates themselves become plural goods—a compromise that reflects and delivers shared benefits to address the competing, partial interests within a community. Unlike theoretical public goods, which are *equal and universal* (non-rivalrous and non-excludable), plural funding reflects the reality of plural goods, which are as *partial and differential* as the unique social ties (stakes) and communication exchanges that differentiate a person.

The opposite of a subsidy is a tax. When communities subsidize candidates through matching plural funds, they lower the price of attention for those candidates—enabling them to communicate in the community's channels at lower costs. Communities can also do the opposite; taxing candidates who are considered nuisances at best or malicious at worst through *negative* plural funding. Here, community members can effectively pay to increase the price of attention for a candidate, signaling their opposition. When different community members who are less affiliated with historical disagreements agree the candidate is "harmful," that candidate is taxed *more.* Conversely, candidates are taxed *less* when opposition comes primarily from similarly affiliated members who historically agree. The intuition is that broad consensus across multiple perspectives is more likely to reflect genuine harm than factional bias or witch-hunts. In its richest form, plural funding operates as a spectrum of subsidies and taxes, enabling communities to amplify unifying candidates while diminishing the reach of divisive ones.[22]

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[20] The tradeoffs of both approaches is reserved for future work. Notably, in the case of drawing subsidies from stake, communities can draw down stake proportional to participant's stake to preserve their pro-rata voting power.

[21] Because communities have degrees of membership, the QF formula would have to be adjusted to reflect partial memberships (instead of assuming "individuals"). This would attenuate influence in sizing cooperative rewards to better reflect the partial differentials within a community.

[22] Plural funding remains a frontier topic with rich mathematical permutations. For example, theories of cooperation have largely focused on "enlarging the shadow of the future" with more frequent, durable interactions (Axelrod, 2006). So far, this paper has emphasized "crossing long bridges"--or social proximity. Plural funding and voting should acknowledge both time *and* social proximity

4.2.4 From Communication to Prediction Currencies

Community currencies can also leverage prediction staking to narrow the agent-principal gap between representatives and their constituents. If irrevocable stake makes a candidate's incentives partially tied to their constituents, peer prediction can extend this alignment by turning candidates into *partial* principals—exposing them to shared risks and rewards through their own forecasts. When candidates support or reject policies and stake their credibility on expected outcomes, they not only signal confidence in their policies but also build a track record of accuracy, reinforcing public trust. Re-election then functions as an implicit feedback mechanism—evaluating not just policies, but a candidate's predictive ability.

However, prediction staking also raises hard questions at the intersection of attention and influence. Predictions, after all, also influence outcomes, particularly when candidates occupy influential social positions or control significant resources—having money, status, or both (Merton, 1948). In these scenarios, a predictor is less foreseeing the future than actively influencing it while taking credit for the "prediction" (e.g., "there will be shortages"). Distinguishing between genuine foresight and influence is an open challenge. One promising avenue is factoring in the social context of a prediction. Just as votes from similar participants—measured by their shared affiliations or voting record—are discounted in plural voting, similarly prediction payouts can be adjusted based on how non-obvious or contrarian the forecast is relative to the shared social context of peer predictors. More similar participants making the same prediction get rewarded less for an accurate prediction, whereas participants who accurately predict counter to social consensus get rewarded more. This design gives predictors an incentive to conceal their positions, maximizing their payout by reducing correlation with majoritarian sentiments. On the other hand, if they disclose their predictions and exert influence by virtue of their social position, their payout is discounted—introducing a trade-off between influencing outcomes and earning prediction bonuses.

4.3 Democratic Overreach

Democratic overreach reflects the fundamental challenge of politics: *balancing public benefits against private costs.* Overreach occurs when public benefits are achieved at an undue or disproportionate expense to specific individuals or groups, sparking contentious questions about what truly qualifies as a "public benefit," where the *line* between private sacrifice and public goods should be drawn, and who bears the burden. Differences in perspective drive political parties and coalitions—not just on whether particular costs are justified but also on what constitutes an "abuse" of that line.[23] Community currencies make two shifts: 1) opening feedback loops between those who benefit and those who bear the costs to rapidly recalibrate the boundary between public and private interests and 2) decentralizing the process of public provisioning, turning top-down political decisions into bottom-up social innovation.

4.3.1 From Overreach to Re-Balancing: Mutual Feedback and Adaptation

discounts. For example, a candidate with unclear social ties— "decontextualized"—would receive no "bridging bonus" compared to a candidate with long historical, overlapping ties.

[23] Classic examples of overreach on the political right include eminent domain, civil asset forfeiture, and progressive taxation. On the left, examples include military spending, police militarization and regressive taxation. Sometimes differences are merely different angles on the same issue. For example, whereas the right cites "censorship" as overreach, while the left points to "surveillance." Yet both are different sides of the same coin of power —centralized control and information, respectively.

Overreach typically results from majorities marginalizing minority perspectives. Community currencies correct for overreach through two interwoven feedback loops—vertical and horizontal. Vertically, communities are embedded in sub-networks, which in turn belong to broader networks. When local communities feel overburdened by higher-level decisions, they can leverage subsidiarity[24] to buy and stake currency in the higher-level network, forming a bridge to feedback their grievances and gain more influence in decision-making through staking. In exchange, participants from global networks who accept local currency gain exposure to local needs, share some of their costs, while feeding back their global perspective. In this sense, community currencies are *communication* currencies, opening a two-way bridge, where buyer and seller now cross into the other's circles, participating in shared goods, slightly shifting coalitions, and staking for greater influence to rescope goods.

Whereas vertical feedback realigns global and local priorities, horizontal feedback balances multiple perspectives *within* any given layer—community, subnetwork, or network—to counter majoritarian overreach. As a first check, square root staking tempers majoritarianism by making participants express the *intensity* of their preference with diminishing returns. However, unequal turnout rates across different factions can still surface subtle majoritarian biases—where higher-turnout groups gain disproportionate influence (Posner & Weyl, 2018).[25] Rather than rewarding more coordinated (often informationally homogenous) groups, "bridging bonuses" in plural voting prevents majoritarian overreach by factoring differences—in affiliations or voting history—to elevate agreements among *different* community members (*consensus across difference*). Integrating multiple perspectives elevates less contentious, broadly supported "low-hanging fruit" policies and goods more likely to unite rather than divide communities—checking overreach.

As circumstances change, so will participants' interests and priorities. While horizontal and vertical feedback continuously renegotiate the nature and boundaries of goods across social groups, participants will also adjust their influence, weighing tradeoffs and staking more in shared goods that matter most to them. Rather than entrenching conflicts about "overreach" along rigid social lines, these tensions act as catalysts for mutual adaptation and social change. Participants redirect their resources (currency) to express their differences and stake their influence to adjust priorities, all the while balancing minority perspectives against majorities as coalitions shift and communities evolve.[26]

4.3.2 Bottom-up Provisioning towards Plural Goods

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[24] Assuming subsidiarity—an important assumption—global currencies should be willing to trade for more valuable, local currencies since they wield greater influence over local outcomes.

[25] High participation rates among better-coordinated, informationally homogenous groups in quadratic voting parallel the challenge in quadratic funding, where minimal cooperation (e.g., $1 contributions) among large, homogenous populations can dominate matching funds, reinforcing capture by elites with disproportionate influence (or a control edge) over communication.

[26] This two-way push-and-pull highlights the importance of subsidiarity: if the global layer holds more power, participants are forced to expend resources aligning the global currency to their interests, adapting to a centralized oligopolistic structure, rather than expending resources to harness local knowledge and form new coalitions locally. Centralization of power not only undermines local engagement but results in "lossy compression" —compressing rich, contextual information that would otherwise inform better global decisions. By contrast, a bottom-up yet nested approach enables communities to horizontally recombine, adapt within cooperative agreements, integrate new information, adjust priorities, and redefine boundaries of contention and consensus.This fosters a dynamic and innovative environment at the local level, where power is more flexible and responsive to changing circumstances. In turn, global power becomes more limited in scope, less dynamic, and—by design—less central to participants' daily lives. This focused and restrained global influence ensures stability while allowing local communities to drive the kind of vibrant engagement and adaptive problem-solving that a more centralized system stifles.

If democratic overreach arises from provisioning public benefits at disproportionate private costs, **the true potential of community currencies lies in decentralizing the choice of what's worth provisioning and at what cost into a bottom-up process that flexibly adapts to the most pressing challenges.** In the classic free-rider dilemma, individuals undervalue their marginal contributions relative to the total benefit they receive from a public good, leaving them underfunded and under-provisioned. Moreover, the set of public goods to provision is infinite. The challenge of democratic governance is to both provision shared goods that individuals lack the incentive to provide on their own, and *to prioritize them.* Quadratic funding (QF) draws on local knowledge, allocating subsidies proportional to the breadth of community support, where small contributions from many are weighted more than large contributions from a few (Buterin, Hitzig, Weyl, 2018). Quadratic funding is both *bottom-up* (responsive to local knowledge of the communities) and *adaptive* (changing with circumstances),[27] channeling resources to where they are needed most.

Community currencies open a substrate for quadratic funding *at scale* and at any social layer: community, subnetwork, or network. Any set of participants or communities can band together, irrevocably staking their currencies to form a broader, umbrella currency. A portion of the community's stake can partially fund the subsidy pool, or in another variation, a portion of the community's inflation rewards. As new crises and challenges emerge, contributions from community members shift, and subsidies naturally redirect to address the most pressing collective action problems under the shared umbrella. Emerging sub-groups that are better equipped to solve problems more effectively than the communities themselves receive subsidies—as signaled by member contributions. These new groups act as proto-communities that can complement or even supplant older communities in attention, to the extent they deliver greater value to their members. In this way, quadratic funding accelerates an adaptive process of social recombination, reconfiguring human cooperation and coalitions toward higher-value productivity. Just as communities bottom-up influence how quadratic funding is apportioned, quadratic funding, in turn, also changes the social structure of networks and communities.

The social dynamism accelerated by quadratic funding is not so much a process of "creative destruction" for shared goods but rather one of "creative reconstruction"—or social innovation. Quadratic funding rapidly integrates local and networked knowledge to "pick up" and subsidize underfunded collective action problems as they arise—simultaneously encouraging the formation of new communities better equipped to solve the most pressing, emergent problems. Participants may redirect their attention and influence toward newer, more relevant communities, they never totalistically exit and abandon the old. Through irrevocable stakes, these communities continue to supply CBI, persisting as historical repositories of cooperation and context, remaining valuable for bridging future divides.

Quadratic funding is a powerful mechanism for social innovation, but it also has limitations. When deeply divided groups polarize a broader network—such as two historically warring tribes—quadratic funding risks entrenching divisions rather than spurring social recombination. This is because quadratic funding rewards numbers, so informationally homogenous, weakly cooperating groups can absorb subsidies ($1 donations)—reinforcing their power by virtue of informational capture, often at the hands of an elite with a control edge over communication. Plural funding acknowledges the interplay of information and control within

[27] It's worth noting that a similar process can occur to extend credit. Specifically, a UBI could be reconfigured to reward members based on the extent to which other community members have staked into their individual accounts. An individual's work or efforts are subsidized with credit (inflation rewards) to the extent that many community members agree (quadratic) or many different people (plural) agree their efforts will confer broad based value to the community.

communication networks, and takes the additional step of subsidizing projects supported by socially (or informationally) unique members—less affiliated with historical disagreements. These "bridging bonuses" accelerate reconciliation. Whereas quadratic funding maximizes subsidies based on numerical turnout—regardless of group affiliation—plural funding redirects subsidies to projects that both sides of a conflict agree are valuable. By factoring in social context, plural funding surfaces and subsidizes low-hanging fruit opportunities for cross-tribal collaboration, increasing the chances of rebuilding trust for lasting peace.

4.4 Corporate Overreach

Corporate overreach represents a parallel challenge to democratic capture, where private gains are pursued at public cost. While previously introduced mechanisms—like contextualizing campaign finance and lobbying—address aspects of corporate overreach, they also generally presume externalities that are clearly defined and understood. However, many harms, such as environmental degradation or anti-competitive practices, emerge in gray areas where externalities are ambiguous, contested, or only recognized after the damage is done. This section explores whether community currencies can go beyond reactive corrections, proactively mitigating harms through communication.

4.4.1 From Externalities to Integration: Talk To The River

Community currencies preempt externalities by augmenting *communication*. Consider pollution in a river, the classic externality: a factory upstream contaminates a river, but downstream homes only discover the damage *ex post*. The river is neither exclusively owned by the factory nor the homeowners. Rather, it is held in common partial ownership by all stakeholders. If such a relationship were represented by a community currency (tied to the access and use of the river), then holders of the currency could stipulate to reveal *more* information about their transactions than if they held nothing in common. This greater transparency would enable members of the community to detect currencies the factory has accepted. Currencies from decontextualized third parties or socially proximate parties known to pollute (or sell inputs that pollute), would trigger the community to open proactive dialogue with the factory and 3rd party to understand the intent and goals. Effectively, the river's community currency pushes the factory and 3rd party into a broader conversation with the community, creating an attention and influence buffer. This broader, lower-bandwidth channel integrates more perspectives. Instead of the factory and third party exclusively negotiating with each other, they must now "talk to the river"—engaging with all its interconnected participants.[28]

Once attention is piqued, then comes pre-emption through influence. If different perspectives across the river community agree the harm is significant, members could leverage quadratic or plural funding to pay the factory to *not* pollute (drawing both on the river currency's stake and their own contributions). Alternatively, the river currency can use funds to buy influence—a partial "reverse merger" into the factory. When the factory accepts this exchange, it receives the broader, river community currency. With this integration, the factory is in a better position to internalize the broader community's "utility functions" and vice-versa, community members internalize the factory's interests. In this way, community currencies move beyond bridging to incrementally internalizing externalities as they arise. The result is a more socially optimal level of pollution.

While river pollution illustrates externalities in the physical world, the same principles extend to information streams in the digital world, such as misinformation or conspiracy-driven flash mobs organized

[28] https://moda.gov.tw/en/press/background-information/8857

online to incite offline harm. When geography and information converge, community currencies offer a unifying framework for integrating both contexts. As participants seek to communicate in broader channels, they encounter attention buffers that trigger dialogue and community interventions when emerging risks are flagged by other members—perhaps aided by context aware community AI Agents (see Appendix). Just as river currency bridges upstream and downstream interests, social media-based community currencies can contextualize communication to facilitate dialogue to socially proximate groups. By opening pathways for bridging, community currencies help manage the interconnected externalities spanning both realms.

4.4.2 From Tacit Collusion to Competition: Unwinding Silent Monopolies

The worst forms of corporate overreach often go uncommunicated. Posner and Weyl highlight how firms engage in unintentional, tacit collusion, creating monopolistic outcomes without explicit agreements (Posner & Weyl, 2018). A prime example is large institutional investors who hold significant stakes across competing firms within an industry (e.g., all major airlines) and exert uniform anti-competitive pressure to lower salaries, cut R&D, and raise prices. Each investor holding a diversified portfolio across rivals creates the illusion of a competitive market, while functioning as a *de facto* monopoly. This is because, while each institutional investor diversifies their portfolio of firms, the firms, in turn, fail to diversify against the influence of institutional investors who—in economic substance and incentives—are the *same*. Instead, short-term profits flow to shareholders, but at the expense of stifled innovation, reduced competitiveness, and hampered growth—all under the appearance of competition.

Community currencies tie voting power to irrecoverable stake, and thus differ fundamentally from transferable shares. Yet, they nonetheless offer valuable principles that can address opaque monopolies in corporate finance. At their core, community currencies encourage us to view "identity" as a changing constellation of stakes to different communities, representing degrees of access and influence to different information streams. Similarly, shareholders are not isolated entities but composites of their economic stakes (even if transferable), along with access to information. Despite appearing *distinct*, the "Big 5" asset managers are the same entity by virtue of their stakes along with their correlated behavior (i.e. shareholder voting history). Under plural voting, actors with the same composition are treated as a single entity and receive a discount.[29] By prioritizing agreements across informationally *unique* shareholders—rather than merely rewarding raw voting power—plural voting in corporate finance breaks the control edge, or influence, of opaque blocs to redirect decisions towards broader shared goals: long-term growth and innovation rather than short-term gains.[30]

4.5 Corporate Capture

Corporate capture occurs when a subset of activist shareholders wields disproportionate influence to steer a company away from its profit-maximizing mandate toward specific social or political goals, imposing private costs for perceived public benefits. This redirection of corporate resources often prioritizes outcomes that disproportionately benefit a narrow subset of stakeholders at the expense of greater profitability. Examples

[29] Firms could also apply a square root to introduce diminishing returns to influence, however influence would still be excessive. Since each asset manager shares identical incentives, behavior, and information, treating them as 5 distinct participants amounts to "account-splitting," bypassing the square root's discrimination. This motivates plural voting.

[30] Notably, the welfare benefits achieved through plural voting—such as eliminating deadweight losses caused by monopolistic behavior—are similar to the outcomes of society collectively compensating the big five asset managers to vote differently, akin to plural funding. The key difference lies in who bears the cost: the shareholders or society at large.

include lobbying for localized initiatives, sponsoring ideologically driven causes, or implementing voluntary restrictions beyond what is legally required.

4.5.1 Game Players v. Game Designers: Balancing Profit & Legitimacy

There are two sides to the debate. Critics reasonably argue for a strict separation where governments regulate the externalities, while firms focus solely on profit maximization. Corporations are "game players" within rules and governments are "game designers" setting the rules. Private companies abrogating public functions undermines both democratic accountability and corporate governance—as being accountable to two goals means being accountable to neither (Bebchuk, 2020). However, this separation becomes increasingly strained in a networked age where corporations cross national boundaries and externalities—both digital and physical—spill into unregulated spaces. These spillovers can also be interdependent (e.g., when online misinformation fuels destructive flash mobs.) Thus, the counter-argument is that shareholder activism is a reaction to regulatory gaps, driven not only by financial concerns but also by the need to maintain legitimacy among broader stakeholder groups—even consumers and employees (Roe, 2003; Davis, 2009). Both sides of this debate circle back to the thorny intersection of economics and politics—money and voting—prompting fundamental questions whose values take precedence, what trade-offs matter, and who decides?

Community currencies open a path for firm's to navigate a third way between strict separation (profit maximization) and shareholder activism. Because community currencies contextualize shareholders within their broader social and economic networks, firms can better evaluate the groups that stand to benefit or bear the costs of any shareholder proposal. Even further, just as portfolio managers diversify against firm-specific risks, similarly firms can diversify against shareholder risks. Whereas portfolio diversification relies on price covariance to minimize idiosyncratic risk at the firm level, shareholder diversification digs deeper—addressing correlations in beliefs, desires and values arising from overlapping communication channels.[31] Proposals supported by shareholders holding less-correlated, less-overlapping community currencies can carry more weight, or influence, than those backed by narrow, like-minded coalitions, even if those coalitions hold a majority of shares.[32] Even further, firms can examine shareholder voting history to further contextualize participants and surface otherwise hidden coalitions. Thus, community currencies open an intermediate computational layer—between the firm and the individual—for social risk management. Notably, these are the principles of plural voting, simply applied to the context of shareholder voting.

Overcoming corporate capture means striking a balance between maximizing profits and maintaining broader legitimacy, while preventing firms from being steered by the self-regulatory biases of dominant shareholders. As firms integrate distinct, multiple perspectives through shareholder diversification (or

[31] The reader might perceive an apparent contradiction between applying the principle of diversification in shareholder voting versus its use by asset managers. However, the principle remains consistent across both contexts. In the corporate context, institutional investors pursue diversification but are mistakenly treated as distinct entities to firms (in voting power), even when their holdings and incentives are largely identical. In shareholder voting, participants are similarly examined based on their underlying stakes, and are treated as distinct only to the extent that their positions and behaviors exhibit less overlap and correlation. In both cases, the principle of diversification is applied to uncover the *underlying structure* within a social or economic network, ensuring that influence reflects genuine differentiation rather than an illusion of diversity. Just as participants diversify their stakes in firms, similarly firms ought to diversify against shareholder stakes—making diversification bi-directional. This approach reinforces the goal of mitigating the risks of concentrated influence masked as independence.

[32] The same risk principles of corporate finance can be extended to community currencies, with an open research area about how to factor stake and transferable currency, and by extension social overlap and correlation, in diversification calculations. Each shareholder is decomposed into the portfolio of community currencies which they own.

anti-correlation), they wring out shareholder bias and enhance legitimacy—striking a third way between a "game player" and "game designer." Simultaneously, by situating shareholders within their social context, firms can more easily identify cleavages and surface consensus propositions that transform seemingly zero-sum trade-offs into win-win solutions—or solutions that strike more stable compromises.[33] In this way, community currencies expand the possibility space to rectify externalities without necessarily compromising profit.

4.5.2 Top-Down to Bottom-Up: Integrating Customer Perspectives

Firm competitiveness—or a plateauing thereof—may be less about external competition and more about the firm's inability to overcome internal biases to reach new customers. For instance, shareholders and employees of dominant technology firms often cluster in a few geographic regions, disconnected from the broader population of consumers who may prioritize different cultural, political, and religious values (Selling, & Strimling, 2023). Already, this paper has proposed factoring shareholders' social contexts (as reflected in community currencies) into voting power to correct for biases and mitigate the majoritarian tendencies that may limit a firm's market breadth and depth. Community currencies can go further, however, also opening channels to integrate a class of perspectives not reflected in shareholder governance: *customers.*

When firms issue community currencies to their consumers, they open a direct channel for feedback. Unlike common or preferred stock, these currencies do not necessarily carry formal voting rights or claims to revenue. Instead, when staked for influence, consumers can voice concerns and provide feedback, creating a structured class of influence based on their consumption and how much they care.[34] Some consumers, recognizing their predictive strengths, may stake their currency to signal the strength of their convictions, effectively turning feedback into "bets" on future outcomes—perhaps even compensated with shares to better align incentives. Importantly, this consumer feedback can serve as a counterweight to activist shareholders, whose priorities may diverge from the realities of the broader stakeholder ecosystem.

Integrating more stakeholders can paradoxically enhance a firm's economies of scale and scope. For instance, a social media platform could use community currencies to give users a voice, choice, and stake in shaping its governance. Non-users affected by externalities from the platform—such as anti-social behavior or the spread of misinformation—would also have an incentive to join, gain currency and provide feedback to mitigate negative impacts. As the platform grows, participants could stake currency into sub-communities that align with their values, creating "community channels" to better price attention. Delegates or elected representatives would likely emerge to voice coalition needs more effectively in the broader network. Over time, the platform would evolve into plural governance—integrating aforementioned mechanisms—where candidates buy attention, communities subsidize aligned representatives, and lobbying stakeholders are channeled into consensus-building. To address pressing needs, participants contribute to proposals that are subsidized by plural funding, with subsidies increasing as proposals gain broader support across socially or informationally unique participants—ensuring the broadest pools reward the most universal needs. Thus, to the extent a company has "top-down management," community currencies introduce complementary bottom-up sense-making to more rapidly address emerging problems and expand reach with deeper legitimacy.

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[33] For example, Microsoft transformed a proposal to reinvest profits in carbon offsets into a strategy to decarbonize the supply chain. Wall Street Journal. "Microsoft Imposes New Climate Requirement on Suppliers in Effort to Lower Its Emissions." *Wall Street Journal*, May 2024. Accessed January 26, 2025.

[34] It's worth considering what non-staked currency would be used for. In some scenarios, it could be traded for perks or even attention or influence across other firms, as competitors would also care about the same class of consumers. In the context of social media, it could be used to pay for attention in new channels.

However, corporate governance operates on fundamentally different principles from community currencies. In corporate governance, shares combine transferable ownership with voting power, allowing both to be transferred (and even separated in empty voting). In contrast, community currencies impose a trade-off between non-transferable stake (voting power) and transferable currency, ensuring that voting power is tied to a deeper, non-transferable commitments. How do these systems interact and evolve together? While this paper does not offer a definitive answer to the question, it's worth considering that the solution may lie in partial, incremental integration. Shareholders, too, will be members of communities. And just as community recovery gives shareholders security incentives to diversify their communities, it also gives platform technologies security incentives to decentralize their communication infrastructure. Moreover, presuming interoperability and subsidiarity, participants over-time may place less emphasis on the firm's shares, diminishing its relevance in motivating bottom-up social innovation. Rather than clashing, these systems may incrementally overlap and integrate.

4.6 From Democratic and Corporate to Plural

Private property traded under global or fiat currency underestimates the spillover effects of goods shared among many participants. Specifically, private property presumes beneficiaries to be atomistic, isolated individuals rather than a set of participants with partial, differential benefits embedded within communities and larger, overlapping networks. Conversely, systems of public property, such as centralized government provisioning, tend to overstate collective benefits—even long after they have expired—leading to persistent misallocation of resources. These distortions in private and public provisioning manifest as "capture" and "overreach"—where money and votes fail to properly match those who benefit with those who bear their costs, ultimately undermining the legitimacy of both mechanisms as systems scale into networks.

4.6.1 From Hayek to Ostrom: Price Signals for Plural Goods

Community currencies bridge the gap between the "public" and the "private," creating a "plural" framework that transforms corporate and democratic systems into something broader and deeper than either—a dynamic network of overlapping, recombining communities that continually reprice attention and influence, bottom-up. Far from opposing the principle of decentralization for private goods— in *The Use of Knowledge in Society*—community currencies extend these principles to plural goods (Hayek, 1945). **The key shift is *enforcement*: while markets for private goods are theoretically free of externalities and therefore require no enforcement, plural goods are *defined by them*;** properly scoping goods requires not only acknowledging partial, differentials of benefit, but distinguishing genuine "cooperation" from adversarial "collusion," or "coercion" from "bribery"—enforcement questions broadly about "abuse" that are tied to social norms, values, and local context. If the world consisted solely of private goods—free of externalities—debates about "cooperation" versus "collusion" would be moot, as every transaction would be isolated. However, such a world would also lack the families, friends, and communities that define, differentiate, and motivate human behavior. Community currencies acknowledge the reality of social cooperation and the communication networks that underpin it, embedding enforcement into the very social fabric to target scrutiny with stakes.

Where Hayek left off, Ostrom picks up—and community currencies carry these principles further. Ostrom showed that communities can self-organize to manage shared resources through locally developed rules, norms, and adaptive enforcement—sensitive to context and governed bottom-up—better than centralized authority (Ostrom, 1990). Building on these insights, community currencies allow members to trade attention

and stake for influence across interconnected communities. Influence is "priced" and attention becomes a fluid, negotiable resource. Just as prices serve as signals for coordinating dispersed knowledge—allowing individuals to make decisions based on local conditions without understanding the broader economic picture—community currencies similarly function as "information signals" for shared, plural goods, guiding decisions by encoding preferences into the prices of attention and influence. A central authority would be overwhelmed by the sheer volume of data and miss the nuanced, context-dependent information that underpins dispersed choices, such as whether to stake for voice or exit with liquidity. Interpreting social interactions through top-down enforcement would require immense (and even infinite) computational resources. As previously explained (§3.3.3), such surveillance would informationally homogenize participants, yet still fall short of the efficiency achieved by dispersed participants continuously integrating information and negotiating these trade-offs in bottom-up, networked processes.

4.6.2 Supermodularity: Overcoming the Limits of Economic Growth

Community currencies also innovate beyond Ostrom's principles from resource provisioning to overcoming limits to economic growth. Specifically, community currencies enable communities to fluidly reconfigure cooperation to unlock greater increasing returns—the true sources of economic growth. Most goods fall between the extremes of purely "private" and "public" with elements of both increasing and decreasing returns. Pure private goods are characterized by *decreasing* returns, where proportional increase in inputs leads to a *less than* proportional increase in output; private goods are adequately provisioned when priced at marginal cost. On the other hand, pure public goods are non-excludable and non-rivalrous and are characterized by *increasing* returns, where a proportional increase in inputs leads to a *greater than* proportional increase in output. Having zero marginal cost (or marginal cost less than average cost), public goods are efficiently priced at $0 and therefore are under-provisioned (Samuelson, 1954).

Yet, both public and private goods are theoretical extremes. Many "private" goods (healthy food, a good bed) confer positive spillover effects that extend beyond the immediate buyer, motivating their purchase for broader social benefits. Similarly, "public goods" are *partially* rivalrous—by virtue of *congestion* (roads), *depletion* (reservoirs), or *exhaustion* (full capacity hospitals or schools)—or *partially* excludable goods by mere geography and access (Buchanan, 1965; Ostrom, 1999). Instead, most goods have *elements* of both increasing and decreasing returns. A restaurant may provision meals, a private good for one person. But the restaurant has properties of increasing returns to the local community patrons it serves, being cheaper to service the community at once than each member individually.

Community currencies express plural goods—between public and private—by aligning *sets of members* around *sets of goods*, each enjoying partial, differential benefits. As participants shift attention and influence to what matters most, member sets change at the margin, adjusting the type of goods provisioned. The fluidity of community currencies makes plural goods (and the communities coordinating around them) both flexible and reconfigurable—grounded in commitments (stake) with combinatorial possibilities constrained by the price of attention and influence. As community structures adapt, networks can exhibit supermodularity—where the marginal benefit of an additional participant, input, or plural good grows as the group, sub-network, or network expands (Siddarth, Prewitt, & Weyl, 2024). Supermodularity emerges from:

- ***complementarity*: *sets of goods*** may be cheaper to produce together than individually because some goods become more valuable when consumed together (e.g., hardware & software, research science) (Lancaster, 1966; Milgrom & Roberts, 1995).
- ***economies to scale and scope***: producing related *sets of goods* together reduces costs (e.g., wholesale retailers, software suites), while achieving cost advantages as the scale of production increases (Panzar & Willig, 1981; Stigler, 1958).
- ***network effects***: benefits to participants grow disproportionately as the number of participants or connected goods increases (e.g., digital platforms, marketplaces, money and payment networks) (Katz & Shapiro, 1985; Metcalfe, 1995).

By seamlessly enabling *sets* of participants to seamlessly align to provision *sets* of goods, community currencies also enable participants to fluidly reorganize into supermodular configurations that maximize economies of scale, scope, network effects, and complementarities. This ability to continuously remix participation and provisioning at overlapping and interlocking social scales enables networks to overcome the real limitations to growth—congestion, exhaustion, and depletion—while unlocking new sources of increasing returns. As communities evolve, the networked sum becomes greater than the reconfiguring and recombining parts.

Quadratic funding *accelerates* supermodularity. Quadratic funding targets community subsidies towards goods more likely to exhibit *increasing* returns, where individuals receive more benefits than the resources they individually contribute. This is because broader, shallower contributions from many—reflective of more public goods—receive greater subsidies than narrower, deeper contributions—reflective of more private goods. When applied across all social scales—communities, subnetworks, and networks—participants not only accelerate increasing returns within these layers but also adjust, recombine, and reconfigure to surface greater nested complementarities *across* them—where interactions across layers generate value greater than their sum.

To fully express supermodularity, however, requires looking beyond expressed preferences to the underlying communication networks influencing them. Under standard economic assumptions (quasi-linear utility, selfish, independent, private values), quadratic funding leads to the utilitarian optimal provision of a self-organizing ecosystem of public goods. However, in reality, humans are not independent but influenced—and often in the same way in authoritarian regimes. Thus, quadratic funding is vulnerable to large, weakly cooperating groups (e.g., $1 from every citizen of China) directing subsidies that would swamp the mechanism and deliver narrower more private benefits to them, at best, or reinforce control edges over communication held by elites, at worst. At the extreme, instead of accelerating increasing returns, quadratic funding risks compounding control edges that control communication and commodify participants as fungible private goods—"humans acting like bots"— with decreasing returns.

Plural funding factors the social context of participants to compensate for quadratic funding's weaknesses. Specifically, contributions that bridge divides—as reflected by historical disagreements and non-overlapping affiliations—receive a "bridging bonus." The intuition is that the more *different* people agree funding a good will generate broad based benefits, the more likely those benefits will, in fact, serve many with increasing returns. Bridging bonuses—along with security incentives in community recovery—motivates participants to differentiate themselves informationally, pushing communication out to new groups, yet partially and incrementally with enough shared context (and managed risk) to enjoy complementarities—or supermodularity. At the same time, bridging bonuses amplifies unique information streams, both increasing the

cost of influence (or participant's "independence") and the chance of serendipitous discoveries at novel intersections. In this way, bridging bonuses accelerate a flywheel of social complexity, non-obvious information, and social innovation towards greater supermodularity—unearthing new synergies within and across social scales as networks expand partially and incrementally.

Hayek observed that markets outperform central planning by processing distributed knowledge, but focused narrowly on private goods, leaving the engines of economic growth—increasing returns—under-theorized and overlooking the social networks that generate knowledge. In reality, increasing returns drive clustering and agglomeration effects, reshaping spatial and economic networks (Krugman, 1991). Plural funding builds on these effects by harnessing increasing returns at the core and extending them to the peripheries through subsidized recombinations of participants and resources, transforming submodular configurations into supermodular ones. Here, overlapping, changing coalitions *are* the computation required to process vast, localized knowledge needed, surface emergent needs, and sustain economic expansion while reducing the risks of capture, overreach and stagnation. Decentralization isn't just compatible with economic growth—it is the social engine that accelerates and scales it.

4.6.3 From Fragility to Resilience: Adaptive, Networked Risk Management

Both economic activity—buying, selling, and bargaining—and political activity—voting and deliberation— are forms of communication, generating information. Unintegrated or unexpressed information—an absence of communication— amplify both risk and uncertainty (Weiner, 1946). Failures in corporate and democratic systems—markets and democracy—in reality, are failures in risk management where majoritarian biases (whether *majoritarian money* in democratic capture and corporate overreach, or *majoritarian votes* in democratic overreach and corporate capture) drown out information—leaving minority perspectives unheard and unintegrated. In a networked age, the challenge is to draw on the virtues of either signals of money and voting, compensate for their weakness to yield a better communication paradigm that manages risk and uncertainty—all without succumbing to surveillance.

Surveillance centralizes risk while suppressing adaptive mechanisms that would otherwise mitigate uncertainty (Taleb, 2012). Control edges reinforce information edges, and vice-versa to centralize power—whether it be in a nation-state, corporation, or both. The problem is not simply that participants communicate more to the centralized power than to each other—leaving important information unexpressed and unintegrated—but that as inevitable crises and enforcement challenges materialize, the centralized power (inevitably and even unintentionally) responds by controlling communication, making participants more informationally the same in the process (Zuboff, 2019). Instead of heterogeneity and innovation, surveillance delivers homogeneity, stagnation, and fragility (Scott, 1998). Humans are treated as redundant, like bots with decreasing returns, while power competition over communication networks end in vertically integrated oligopoly, at best, and winner-take-all singularity, at worst (Varian, 2011; Wu, 2010).

Community currencies open an alternative future—plurality—where humans become agents of increasing returns in decentralized networks. Subsidiarity expands the *depth* of networks—pushing *down* control to integrate information bottom-up, while bridging bonuses expand *breadth*, pushing information *out*. As participants diversify their communication to neighboring groups and join broader coalitions, they differentiate themselves informationally, increasing their cost of influence and agency. At different social scales—communities, sub-networks, and networks—bridging bonuses elevate consensus across differences,

underweighting the influence of homogenous groups while amplifying perspectives that are informationally unique. Thus, bridging bonuses spur multi-layered diversification at all social scales to cancel out idiosyncratic risks (or biases) arising from correlated and overlapping communication. This diversification manifests respectively by greater intersectionality (or individuality) and social complexity (Ashby, 1956). With greater interconnections branching into shared contexts, useful and non-obvious information (local knowledge) travels seamlessly through communities and subnetworks, bridged to new contexts for relevancy, and propagated forward to neighbors for integration.

Systemic risks arise from uncertainty, where incomplete or unintegrated information prevents participants and their networks from seeing interdependencies. While community currencies cannot eliminate systemic risks, they both create localized buffers to absorb shocks without centralized failure and open opportunities for networks to collaboratively adapt to overcome them (Taleb, 2012). Specifically, because bridging bonuses mitigate idiosyncratic risks within a social layer, participants, in turn, can focus on identifying and addressing systemic risks that arise from interdependencies across layers. In fact, as layers of a network realign and reconfigure in creative reconstruction—seizing opportunities where outputs grow faster than inputs—the network integrates information to unveil hidden interdependencies and harness them for growth. Thus, the very process of social innovation—finding increasing returns and expressing supermodularity—is itself a social, networked process—extending the reach of communication to uncover sources of risk and, at times, making the unknown partially more knowable.

§5 Conclusion

Human attention is our scarcest resource. What we pay attention to determines the information we process in adaptation (input), and the influence, or control we seek to exert over outcomes in feedback (output). Together, attention and influence form two sides of power: information and control. The two ubiquitous systems for regulating power—democratic and corporate governance—center on balancing two levers: money and voting. Both feedback information and exert control—enabling principals to *express* preferences and *align* their agents in different ways. Yet, both systems evolved and adapted out of an analog age, with assumptions about the *principal's* own attention. Democratic governance presumed attention was largely scoped and constrained by geography; thus, geographic representation could turn up a map of biases—expressed through votes—for reconciliation and bridging in Congress (and checked by other branches of government) to yield policies broadly in the public good (Madison, 1787; Allen & Pottle, 2018).[35] Similarly, corporate governance ("game players") historically operated within the jurisdiction of nation-states and could nest within democratic governance ("game designers") to check excesses. The digital age upends these analog assumptions with non-local communication networks that radically transform how we share information and what we pay attention to. Biases no longer cut neatly along geographic lines, while corporations transcend democratic nation-states.

The governance crisis of the digital age is not simply "money buying votes," but rather money buying *attention*, and on the cheap (Wu, 2017). Global channels, like social media, collapse context into competing global commons. The ensuing competition for influence is a tacit global "attention auction." The paths to win mirror the two sides of power: information and control. One can rig the auction to their favor by controlling a global channel; flood the information environment with controlled bots and biases—an advantage wealth buys; or stoke conflict, controversy, and conspiracy—tapping into fight-or-flight reflexes as the fastest route to capturing attention. The most unscrupulous employ all three. As participants polarize and correlate along non-local, non-geographic divisions, **unseen "tacit digital majorities"** emerge. As a result, geographic-based systems of representation fail to easily surface common ground for public goods while shareholders fail to navigate profit-maximization goals coherently—both systems instead succumbing to "overreach" and "capture."

5.1 One Money, One Auction: Reflexivity in Influence

Yet, the networked digital age also poses a deeper, underappreciated risk: attention auctions converge with financial auctions, creating a feedback loop between social and financial capital that ends in reflexivity in influence (Wade, 2013). The rise of memecoins already hints at this convergence; a bet on a memecoin is a bet on influence based on positioning within a network. Specifically, the price is propped up by attention rather than underlying utility or value. This is an old form of "tunneling" reminiscent from the joint-stock era (pre-corporate governance) but under a new guise. Instead of controlling parties tunneling valuable assets away from shareholders to entities they control, influencers tunnel *attention* toward speculative assets they control—extracting value from less informed participants zero-sum. Memecoins are *worse* because there are no real assets being tunneled—only attention itself. Asset tunneling leads to adverse selection—where bad actors

[35] Madison relied on the geographic expanse of the United States as a check on the influence of factions, a restraint that no longer exists in digital worlds; "Hence, it clearly appears, that the same advantage which a republic has over a democracy, in controlling the effects of faction, is enjoyed by a large over a small republic,--is enjoyed by the Union over the States composing it...The influence of factious leaders may kindle a flame within their particular States, but will be unable to spread a general conflagration through the other States." (Madison, 1787).

profit while good actors withdraw, stymying growth and investment. But attention tunnelling goes a step further by eroding trust, connection and common ground. Anti-social behavior becomes a winning strategy; the seasoned "financial nihilist" first exploits fear and division to hijack attention, then channels influence into greed—converting followers away from agents of positive-sum value creation towards instruments of zero-sum "rugs." When public officials leverage their position of trust, such "rugs" become *negative-sum*—allowing them to profit from decline as adversarial actors buy political favors (emoluments) to their constituents' detriment.

Taken to its logical end, financial nihilism abandons the aim of governance—ensuring agents remain accountable to their principals. Instead, it becomes a wager on who can best exploit asymmetries, effectively betting on the already-powerful becoming more powerful. Even if voting persists in *form*—whether *one-person, one-vote* democracy or *one-share, one-vote* corporate governance—*one-dollar, one-vote* prevails in *substance*. As money buys attention, influence battles shift toward which money will reign supreme. At best, this competition for "money majoritarianism" ends in a pareto distribution, concentrated in the hands of a few oligopolists. At worst, it ends in winter-take-all singularity: centralized surveillance—unchecked by geography and limited only by the human attention span and the depth and breadth of their digital interface.

5.2 Many Moneys, Many Auctions: Reflexivity in Context

Community currencies are also attention auctions. But because membership to a community can be expressed relationally—as partial differentials of communities, or vice-versa participants—community currencies are not isolated but form an interdependent network of many attention auctions. If one global attention auction decontextualizes participants, many community currencies recontextualize them. The trick to preventing all auctions consolidating into one is making community currencies an *extension* of communication, not an instrument to control it.

Whereas money today buys both information (attention) and control (influence)—content and the channels, the message and the medium—community currencies force a *trade-off*; participants continuously choose between gaining more control within a channel (staking irrevocably for influence) and the opportunity cost of engaging with new communities for novel information (attention). By expressing this tension into a single unit of account as a trade-off—a push and pull—community currencies make explicit what really is at stake: our attention and influence over it. Subsidiarity redirects our attention to our immediate environments to process local information—while plurality gives both security and legitimacy incentives to bridge information *out*. Combined, both principles reconfigure communities across new lines with *partial* entries and *partial* exits, in an ever thickening web of cooperation across greater social distances—partially and incrementally. In this way, community currencies transform *reflexivity in influence*—where power compounds asymmetrically —into ***reflexivity of context***, where communication refracts power out, changing the structure of communities, subnetworks and networks in response to new information. Even if each community currency succumbs to Pareto's Law, overlapping, recombining communities open the possibility for power to cancel out in a normal (Gaussian) distribution.

5.3 Open Questions in Networked Governance

We find ourselves today grappling for a governance system that builds on the strengths of democratic and corporate governance, but also overcomes their limitations—being networked and scalable for cooperation, but grounded in the structure of our communication—physical or digital—with human attention as our scarcest resource. Community currencies offer a first pass on a substrate for governance designed for the

complexities of our interconnected world. Yet, community currencies also raise as many questions as they open new directions. Can community currencies complement democratic and corporate systems, or do such legacy systems risk undermining the subsidiarity required for community currencies' enforcement? A related tension is other money systems. Community currencies push fiscal and monetary policy questions to stakeholders (e.g., the inflation rate and the size of the "fiscal treasury" for funding plural goods). In contrast, nation-states separate these roles in different institutions. Are community currencies fundamentally at odds with the premise of fiat currencies? Relatedly, proponents of Proof of Stake or Proof of Work protocols rely on a consensus mechanism tied to the accumulation of resources (compute or stake). Proponents often invoke an unspecified "social layer" to handle disputes (e.g., soft-forks v. hard-forks), including concentrations of power and conflicts of interests. Community currencies express not merely a social layer, but a social fabric. What are the implications on consensus?

Community currencies herald a paradigm shift in social organization for the networked age. Many have noted the decline of civil society institutions (churches, food cooperatives, community associations) and a crisis of legitimacy among think tanks, unions, journalism, and charitable foundations (Putnam, 2000; Levin, 2020). While the causes vary, a common challenge is balancing financial and non-financial contributions in a way that is transparent, checks bias, and yet continues to motivate participation with adaptation. Community currencies make these trade-offs explicit, and enable groups to express and navigate these tensions bottom-up. Specifically, by allowing participants to decide how much to stake (voice) versus retain as transferable currency (exit), community currencies allow institutions to evolve incrementally along the spectrum of financialized and non-financialized governance—based on the preferences of the members. When an institution becomes *too* financialized, non-financialized members are able to fork into new communities, while retaining some influence in the old—and vice-versa—maintaining a web of institutions that is adaptive and socially complex rather than rigidly converging toward pure financialization or pure voluntarism.

Community currencies also herald more profound shifts in how we navigate questions of provisioning. Already this paper has sketched how community currencies can prospectively mitigate externalities and overcome the limits of economic growth with plural funding. The flipside is also retroactively rewarding value creation. Community currencies can embed context into intellectual property regimes, where incenting innovation and creativity requires rewarding contributions that are unevenly and partially distributed across networks ("deep funding"). The implications extend beyond provisioning to reimagining credit and insurance systems; reframing policy debates about trade and security (or speech and censorship); and even updating regulatory regimes designed in the analogue age for greater coherence and legitimacy in the digital age. Historically, regimes have checked different *aspects* of power—market power (antitrust), information (securities regulation), etc. Community currencies open a pathway for bottom-up computational governance that overcomes regulatory conflicts in the digital age, with the flexibility to adapt and respond to novel challenges (e.g., social media and memecoins).

The question of regulation is particularly acute as we navigate the next great offset: artificial intelligence. Recent advancements in AI (e.g., DeepSeek) challenge the assumed performance returns to compute, underscoring instead the increasing significance of neural network structure that activate subsets of parameters during inference. As a first sketch, the Appendix, "Attention is All We Have" suggests how community currencies—as *communication* and *attention* currencies—can embed social context into the structure of neural networks to enhance performance, harness the promise of AI agents, while empowering participants to manage their perils. This aims to provoke deeper reflection on the transformative potential of community currencies in

AI governance—or networked risk-management. By decentralizing control through subsidiarity and diversifying information flows through plurality, community currencies stymie idiosyncrasies from universalizing into systemic risk. Community currencies don't solve systemic risk, but clarify it as the focal point for social innovation.

§6 Attention is All We Have (Appendix)

6.1 Dual-Use AI: Promise & Perils

AI agents are dual-use, offering promise but also raising new perils. On the one hand, AI agents can help individuals and groups advance their interests, uncover shared goals, and negotiate differences—bridging social divides and fostering collaboration to find common (or even uncommon) ground. On the other, AI agents can be maliciously deployed to spread disinformation, generate deep fakes that destabilize trust, or even fuel speculation (e.g., memecoins.) Worse, AI agents risk being manipulated by adversaries to extract information about a participant's motivations and intents for an information advantage in negotiation. More often than not, the wealthy hold a disproportionate advantage, as they can afford to spam the most sophisticated bots (or AI agents). This wealth-advantage risks a feedback loop where capital manipulates information environments to gain resources and control, which in turn reinforces control over information in a flywheel effect—ultimately centralizing power into a few AIs, at best, or one global surveillance AI, at worst.

This section does not capture all the nuance and complexity of AI agents, but instead sketches how community currencies can address a few of these perils while structuring agents' attention to enhance security and context-aware communication. Offered as a starting point, this section leaves broader implications—including integrating this vision with the current political economy of frontier AIs—for future work. For simplicity, references to "community currencies" assume the PCARE model as a baseline (§2), along with the principles of subsidiarity and plurality (§3).

6.1.1 Provenance: Social Origins in Communication

An AI agent that accepts or exchanges transferable currency in a transaction engages in an act of communication, underscoring that community currencies function as *communication currencies*. Here, an agent's currency signals its provenance—or social origins. A currency is not an isolated medium of exchange, but is held by a subset of participants in a network. Specifically, a currency is issued by a community, and a community refers to a set of members with varying stakes, who in turn are represented by their unique constellation of communities with varying degrees of stake *ad infinitum*—forming an interconnected social fabric in vector space. (Conversely, a participant is represented by their stakes across different communities, which in turn are defined by their unique constellations of participants—expressing the same recursive structure.) Thus, a currency's provenance can be expressed relationally with measures of social distance. AI agents, then, are no longer faceless, financialized forces of deep fakes and disinformation. Instead, their origins are traceable to the communities that fund them, and the individuals that compose them—expressed *relationally* with social distance.

6.1.2 Costly Spam & Disinformation: Raising the Price of Attention

Community currencies increase the cost of spam and disinformation by embedding social context in communication. If global communication channels (e.g., social media) operate as a global attention auction, community currencies restructure this auction—moving interactions out of "low-bandwidth" global channels, where participants are socially undifferentiated, into many nested attention auctions, where participants are highly differentiated. These social buffers not only sharpen price signals, but also clarify an AI agent's motivations. As the agent tunnels deeper into "inner circles," progressively paying more for attention, communication shifts from indiscriminate, high-noise environments to more fine-grained, "high-bandwidth"

channels. At each level, the agent learns more about the targeted community, but also has to reveal more about itself. Rather than a single, undifferentiated price for attention, community currencies (under conditions of subsidiarity) escalate the cost an AI agent must pay for deeper attention and influence. This progressive escalation doesn't eliminate spam or disinformation, but makes it costly.

6.2 Agents

6.2.1 Coalition Agents: Security in Diversity

As in politics, a natural defense against adversarial actors is forming a coalition. Communities will coalesce around shared values and goals, creating an attention buffer that filters interactions with AI agents lacking shared context and posing a higher risk of adversarial behavior. By staking their respective currencies into a coalition currency, member communities form an umbrella currency that AI agents must buy and pass through before deeper communication.

A step further, communities can establish a coalition agent—an AI representative saddled with currency to respond collectively to soliciting AI agents. A coalition agent is a composite of member AIs, integrating member inputs while preventing any single one from dominating in generating the output. Influence within the coalition is weighted by the square root of each member's stake, ensuring that larger members do not overpower smaller ones. Additionally, the coalition model can apply a correlation discount: informationally similar inputs (from more socially similar members, as measured by overlapping stakes) are weighted less, while informationally distinct members receive a "bridging bonus."[36] The intuition—like plural voting— is that member AIs who are more socially (and therefore informationally) unique within the coalition are more likely to contribute inputs that help bridge divides, and therefore merit earning a "bridging bonus" that amplifies their influence on outputs. Conversely, more similar member AIs tend to reinforce majoritarian perspectives rather than express the coalition's breadth—therefore incurring a "correlation discount." This social attenuation ensures that the coalition agent produces a more balanced and integrated output—one that synthesizes multiple perspectives, rather than simply reflecting the coalition's dominant voices.

Security in coalitions requires striking a balance: revealing enough information to enable cooperation but withholding details that could be exploited by adversarial agents or even competing members within the coalition. This demands a high sensitivity to context—what Helen Nissenbaum terms "privacy as contextual integrity" (Nissenbaum, 2010). When generating an output, a coalition agent draws on inputs from its member AIs, which in turn selectively determine what information to share based on their community's consensus on the legitimate *usus* (use), *abusus* (misuse), and *fructus* (benefits) of information. Because member AIs are embedded in a social fabric—represented by stake and transferable currency—the process of generating context-aware inputs can be calibrated by the degree of social overlap, partially and differentially; greater overlap allows member AIs to draw from a richer pool of shared information (or channels), while less overlap narrows information from outer, public channels. When synthesizing member inputs, a coalition AI can weigh less redundant inputs with social overlap and weigh more unique inputs (even if they originate from a member AI's outer channels). This dual-layered context-awareness—both at the member AI and the coalition AI

[36] In measuring social distance and proximity, both *stakes* and *transferable currency* ought to be factors, as they represent participation to a communication channel. However, transferable currency should matter less as it's not fixed, or staked to represent a commitment. How to balance this gradient is an open question. Furthermore, when calculating "bridging bonuses" or "correlation discounts," in addition to measuring social proximity in the social fabric (*ex-ante* information), models can also factor the semantic difference between member AI inputs (*ex-post* information). This is another balancing act for research.

levels—ensures that outputs are sharpened and synthesized to reflect a broader yet coherent perspective, preserving sensitive information without compromising the broader coalition's ability to band together under shared interests.

The more diverse a coalition, the more resilient and secure its agent becomes against adversarial attacks. A coalition agent responds to inquiries as a unified entity, disclosing shared goals rather than individual member motivations. Greater diversity within a coalition increases the resources required to map the coalition's internal structure—identifying consensus points and cleavages—potentially at a superlinear rate. Here, diversity is measured by social distance or minimal overlap communication channels among members—reflected by stake and transferable currency. Intuitively, the fewer shared information flows within a coalition, the higher cost of extracting insights about its internal differences—requiring deeper probing at escalating costs. The same principle of diversification bolsters the defenses of a member, or community AI. When members are less overlapping in affiliations and information flows, the price of attention to parse member motivations and then "hijack" the community with influence rises, possibly superlinearly.

This nested feedback and adaptation—community AIs within coalition AIs, etc.—presumes that member communities retain fine-grained control over their agents, revealing just enough information about their goals to the broader coalition without overexposing themselves. This underscores the importance of subsidiarity, where local communities have greater stake than global communities in scrutinizing and testing the parameters and "alignment" of their local agents—extending the enforcement mechanisms discussed in §3.

6.2.2 Personal AIs as Composites of Community AIs

Community currencies introduce a new paradigm for personal AI agents—one that more faithfully captures the complexity of individuality while strengthening safeguards against advanced AIs extracting sensitive information and secrets. A personal AI mirrors the logic of a coalition AI, but in reverse. Just as communities can stake their currencies to form a coalition AI agent, a personal AI emerges as a composite of the community AIs that a participant is affiliated with. Each community AI represents a distinct social affiliation or facet of a participant, defined by the participant's commitment, or degree of stake (boyd, 2022). Together, these affiliations shape the personal AI's evolving identity—reflecting shifting priorities and values with shifting stakes. This approach extends Georg Simmel's theory of intersectional identity, which understands communities as constellations of individuals, and individuals as a unique constellation of communities (Simmel, 1905). This composite nature of identity ensures no personal AI exists in isolation; it is always embedded in the contexts and values of the communities it interacts with and holds stakes in. Likewise, no community can be fully understood without recognizing it as the sum of its unique individuals.

Intersectional personal AIs mark a radical shift from conventional assistants that indiscriminately surveil data, eavesdropping on all conversations—often without the knowledge or consent of other interlocutors—to model both the participant's behavior and, inadvertently, that of their contacts. Rather than hoovering up *all* conversations and processing them the *same*, a personal AI draws on input from community AI agents, weighted proportionally to the square root of participant's stakes in each community (and then further discounted based on overlapping affiliations). Unlike monolithic personal AIs that centralize data into single points of vulnerability, intersectional personal AIs synthesize inputs from community AIs—preserving privacy through differentiated access while adjusting for redundancy with correlation discounts. This

intersectional approach not only delivers context-aware, personalized responses but also ensures that the boundaries of each community conversation are respected, safeguarding sensitive information.

Maintaining contextual integrity requires shielding participants from surveillance. A key vulnerability arises when a participant deputizes both a personal AI and a surveillance-based AI, allowing the latter to exploit community conversations for an information advantage, violating privacy norms. This enforcement challenge, akin to policing bribery, underscores the importance of subsidiarity. Local AI agents—being the most context-rich and "high-bandwidth"— require stricter scrutiny, to ensure accountability and deter abuse. In turn, this requires local currencies to be more valuable than global, decontextualized counterparts, so scrutiny is scoped and scaled to stake. Thus, subsidiarity is a key condition to ensuring privacy expectations are enforced and surveillance is punished (see §3).

6.2.3 Adaptive Weights and Biases: Integrating Social Context in Neural Networks

Many assume that indiscriminate data surveillance and centralized compute will continue to make AI more performant AI with better predictions. Indeed, today's frontier models owe their rapid advancement to hoovering vast amounts of human-generated data. But as AI-generated language feed-back into human conversation, frontier models risk degrading the very signal that made early models effective, leading to diminishing returns at best, or accelerating model collapse and semantic drift at worst (Shumailov, 2024; Spataru, 2024). Surveillance AI follows the same trajectory of generalized surveillance: just as the surveillor's gaze distorts communication by pulling in participants into a single feedback loop, AI models trained on their own outputs risk collapsing linguistic diversity into self-referential homogeneity. Rather than relying on *more* centralization, community currencies enable participants to leverage decentralized computation of changing social relationships.

When participants communicate—staking for greater influence or spending currency for attention—they perform social computation that encodes human priorities. The evolving structure of social relationships, as reflected in staking patterns, signals shifts in values, meaning, and context. Stake in a community is not an isolated value but a relational vector, defining communities through members' stakes and representing members through their unique stakes, recursively. Shifts in stake therefore map directly onto changes in the social fabric. Just as community currencies express a structure of influence and communication—through stake and transferable currency, AI models similarly also encode their own parallel structure through weights and biases. Thus, community currencies provide a natural substrate to bridge social network to neural networks—encoding the interdependencies in communication that makes the highest-bandwidth communication possible.

A model's weights determine how inputs influence outputs. In today's large-scale foundation models, weights are set through centralized training on surveilled datasets, while agents adapt their weights —often unpredictably—based on real-time feedback. Community currencies challenge this paradigm, favoring a vision of interrelated AIs, in dialogue, forming a broader, networked model that mirrors the structure of social networks. Querying an agent does not retrieve an isolated response but engages a broader network of affiliated AIs, where stake determines influence. For example, a personal AI draws inputs from the community AIs to which a participant has irrevocably staked, while a community AI draws inputs from the personal AIs staked within it. An AI synthesizes these weighted inputs, attenuating information from stronger affiliations (with a square root and correlation discount) while also integrating inputs from weaker ties (with a bridging bonus).

Over time, this stake-weighted interaction mirrors how linguistic meaning emerges—not from fixed definitions but through continuous interpretation within a network of speakers (Wittgenstein, 1953). Similarly, AI-generated responses are not static but embedded in a web of social triangulation, where querying an agent triggers a feedback loop of mutual interpretation and adaptation. Outputs that generate consensus, conflict, or contradiction prompt participants to adjust their commitments (stakes). As stakes shift, so do weights. This social computation enhances the internal coherence of communities while negotiating differences across a broader network of beliefs—sharpening meaning, clarifying context, and deepening intelligibility at scale (Davidson, 1973).

If weights influence outputs, biases influence responsiveness. In neural networks, an activation function determines whether a neuron produces an output based on a weighted sum of inputs. Biases act as offsets, modifying the pre-activation value and influencing how easily a neuron reaches activation. Traditionally, biases are fine-tuned using data and remain fixed to align the model with observed reality. However, community currencies introduce a dynamic, non-arbitrary mechanism for adjusting biases: real-time exchanges of transferable currency, where transactions function as offsets. A large bias increases the pre-activation value, lowering the barrier for inputs to surpass the activation threshold. Conversely, a small bias reduces baseline responsiveness, making activation more dependent on stronger inputs—such as deeper social ties. Whether currency exchanges *alone* are sufficient to set biases—and how they interact with weights—is an open question this paper invites.

6.2.4 Context-Aware Communication: Leveraging Stake for Nuance

Integrating the social structure into the structure of neural networks allows for more context-aware communication between agents. When an inquiring agent trades currency to communicate, the selling agent's response is not merely a function of how much was paid (or the compute it buys), but the shared context between both agents. For example, when two personal AI agents are socially proximate, holding stakes in overlapping communities, their shared community AIs can access inner channels (or high-bandwidth information flows) to craft more nuanced, context-sensitive responses which feed-back into the personal AI's weighted output—emphasizing common ground. In contrast, when AI agents from distant or unconnected communities trade currency—without any immediate shared stakes—the agents' constituent AIs draw only from low-bandwidth, more public channels accessible by currency for a more generic response. Agents with closer, trusted connections benefit from deeper and richer response, while foreign agents merit generic responses. Thus, whereas currency exchanges help overcome baseline thresholds for communication between agents, stake establishes the *depth* of information an agent can draw upon when synthesizing an output. In this way, agents are "anchored" to the communities they know, while still capable of cautiously interacting with new, less familiar ones.

6.3 Adaptive Risk Management

6.3.1 Partially Open, Partially Closed

Already this paper has underscored how community currencies mitigate idiosyncratic risk to sharpen focus and social innovation on systemic risk (See Section IV.E.3). The same principles can be extended to a network of AIs, to the extent they integrate the principles of plurality and subsidiarity as diversified composites of affiliated AIs. However, community currencies do more than enable diversification—they also allow communities to express greater risk sensitivity and take additional precautions, especially as unaffiliated and

decontextualized AIs operate outside these frameworks and introduce interactive risks. Whereas current debates on AI safety and risk center on the binary of open vs. closed systems, community currency open a third path—*partially open, partially closed*—devolving risk-sensitive decision-making to communities themselves, allowing for more context-sensitive judgments.

Each community will take a different approach to risk. Some may entrust their members' judgement —and the laws of supply and demand. This is more likely in global communities where enforcement is weaker. Other communities—particularly local communities with more at stake—may take a more cautious approach. To compensate for risk, local communities have a handful of options; some may price discriminate in the form of minimum thresholds to express risk tolerance; escalate "taxes" on AI agents based on their social distance; or require a staked deposit or bond. Some communities may adopt bright line rules, while others apply muddy standards— relying on AI agents to help define these rules and gather information to enforce them.

How AIs integrate the risk thresholds of their composite members remains an open question for research. For example, in the case of distance taxes, a personal AI—composed of its affiliated community AIs—must account for multiple risk thresholds as part of its model. If it fully integrates the highest thresholds among its communities, it naturally aligns with the strictest standards and avoids penalties. However, if it selectively navigates between communities—elicing inputs from communities within the threshold—it may trigger penalties (e.g., burns) if it generates an output that violates a particular community's privacy norms or misrepresents their stance. Integrating risk preferences into the structure of neural networks remains an open research question—one that raises longstanding debates in liability: should strict, universal thresholds be imposed, or should AIs dynamically navigate varying risk environments under a reasonableness standard? Accommodating a range of approaches will fundamentally reshape how we design and understand networked model architectures.

6.3.2 Partially Light, Partially Dark: Mapping Trust and Boundaries

A network of community currencies functions as a dynamic map, where shifts in the distribution of transferable tokens and stake signal corresponding changes in the underlying structure of communication—and, by extension, information and risk. As stakes change and affiliations branch and diversify into proximate communities—what's considered "proximate v. far" or "safe v. unsafe" is continuously redefined. Social distance has two dimensions: the *breadth* of shared affiliations across different communities (how many community currencies held in common or being "close" to held in common) and the *depth* of commitment (measured by relative stakes). The boundaries of what is "safe," "neutral," and "unsafe" reflect degrees of social overlap—signifying overlapping communication, shared context, and by extension, shared information. Thus, greater social distances indicate higher risk or variance in information, while the distance between two points on the social fabric measures relative risk or mutually unintegrated information—defining the "distance" of any potential bridge. Areas of non-overlap act as "information sinks"—gaps in connectivity between communities, making them "far." (As emphasized in §3, subsidiarity is key to ensuring information sinks don't simply mask the presence of colluding groups.)

Community currencies implicitly map the structure of communication—and by extension, risk and information—but it's a map not meant for any single participant or AI agent to fully see. The challenge in networked cooperation is to share enough information to enable collaboration without revealing so much that it invites adversarial attacks or hands an advantage to those already with a control edge—an advantage that can

rapidly escalate into surveillance. Where full transparency ("all light") overexposes information and total opacity ("going dark") stifles cooperation, community currencies offer a balanced alternative: *partially light, partially dark* which constrains adversarial agents by limiting their visibility. Under this framework, each participant's perspective is both unique and incomplete.

Already this paper has highlighted the informational differences that arise based on one's position within a network: as a community member, a proximate participant, or a distant actor. To draw on cosmology as a metaphor, members have intimate knowledge of their community—like sharing a planet—while more socially distant participants—in a coalition—are part of a shared solar system. Participants know about each other, but less—perhaps expressed through ZK proofs about ~~social~~ social aggregates (consensus, cleavage points, etc.). Farther out in the network, disconnected communities without directly overlapping members but with traceable shared stakes appear as hazy galaxies, visible only in relation to other known structures. To a distant or unconnected participant, their coordination resembles "dark matter"—showing gravitational effect, but otherwise opaque. Just as physical distance limits visibility in space, social distance—measured by shared communication and commitments—limits the breadth and depth of access for AIs. Thus, community currencies provide each participant a unique map based on their position, revealing pathways and places to extend trust and cooperation, while allowing communities to safeguard their boundaries and maintain distance from actors they know and trust the least.

6.3.3 Money Can't Buy Love; Subsidiarity as a Shield

The current political economy of artificial intelligence stands in stark opposition to this pro-social yet context-sensitive vision. Frontier models are centralized, rely on mass surveillance for training data, while unleashing decontextualized, unaccountable agents—deepening risk and uncertainty. This paper challenges the notion of isolated AIs as a standalone, self-sovereign entity. In contrast, the vision proposed here is a *network* of contextualized and interrelated AIs—each unique with *partial differentials in stake*—that mirror the natural patterns of human communication and social ties, accountable to the participants they assist. Subsidiarity *deepens* AI networks—pushing *down* control for accountability, while bridging bonuses expand *breadth*, pushing information *out* for social dynamism and recombination. Rather than flattening communication and homogenizing human relationships with top-down, monolithic control, this approach diversifies and enriches human relationships with bottom-up, accountable communication. The result is an adaptive, context-rich ecosystem that redefines what it means for AI to operate *within* society rather than merely *on* society.

Community currencies don't protect against *all* adversarial AI attacks or eliminate *all* systemic risk; instead, they open the possibility space for a web of enforcement and resilience that is only as strong as the local power underpinning it. Without subsidiarity, community currencies risk being swallowed by global surveillance AIs (and their global currencies). Continuing the cosmology metaphor, such global currencies (powering global AI agents) risk becoming akin to centralized black hole singularities, collapsing social distance and bending communication to a single point of failure.

Fortunately, the world is still made of atoms, not just bits—where trust, status, and non-financial relationships matter: family, school, and faith communities. Even as digital networks trend toward oligopolistic control and risk centralization, the most meaningful exchanges remain in person, within trusted relationships. Community AI agents—rooted in local relationships and deputized to extend cooperation—can serve as the foundation for a bottom-up alternative, reinforcing subsidiarity by remaining subject to the highest scrutiny and

accountability. In this way, the most cherished human connections—where "money can't buy love"—become sources of decentralized power.

6.4 Attention is All you Need, Attention is All we Have

The seminal paper *Attention Is All You Need* demonstrates how transformers achieve nuanced understanding of sequential data by computing attention scores that highlight relevant inputs (Vaswani et al., 2017). The model presented here extends this concept beyond computation alone, incorporating human attention as a resource within communication networks. While transformers prioritize *data relevance* within sequences, this model prioritizes *social relevance* across communities. Both approaches—data-driven and socially-driven—enhance adaptability and responsiveness. Where transformers parse internal *data dependencies*, this approach navigates data's underlying *social dependencies*. Together, these systems are complementary: transformers distill relevance within structured data, while this model distills relevance within dynamic social structures, focusing "attention" where it is most meaningful in both technical and human contexts.

Thus, a vision emerges of a network of interdependent AIs, each evolving along gradients of commitment. Personal, community, coalition, and network AIs are not standalone entities but partial differential composites of one another, synthesizing inputs to generate context-sensitive, unique outputs. Through communication and shifting commitments, both social networks and information structures co-evolve, increasing in complexity and coherence over time. The cost of influence (stake) and the price of attention (currency) serve as dynamic signals, continuously reflecting shifts in priorities, weights, and biases. More than just a collection of AIs, this is a multi-layered, interrelated intelligence network—one that refines and adapts to become greater than the sum of its parts with each act of communication.

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